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**U.S. ARMY SOLDIER AND BIOLOGICAL CHEMICAL COMMAND**

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**MAN IN SIMULANT TESTING OF THE MARK IV AND  
KAPLER CPF3 PROTECTIVE SUITS**

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Man in Simulant Testing of the British Mark IV and Kappler CPF3 was conducted to determine suitability for use under the Chemical Stockpile Emergency Preparedness Program. The Mark IV was configured with a powered air purifying respirator (PAPR), standard butyl gloves, and green vinyl overboots (GVO). The Kappler CPF3 used the self-contained breathing apparatus (SCBA) respirator, standard butyl gloves, and toxicological agent protective (TAP) boots. All tests were conducted with the mustard agent simulant methyl salicylate at a concentration of 50 mg/m<sup>3</sup> for 30 min.

14. SUBJECT TERMS

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dose	SCBA	PSD

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## **PREFACE**

The work described in this report was funded by the Chemical Stockpile Emergency Preparedness Program (CSEPP) and was started in March 1998 and completed in June 1998.

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## CONTENTS

1. INTRODUCTION .....	7
1.1 Description of the British Mark IV Overgarment .....	7
1.2 Description of the Kappler CPF3 Protective Suit .....	8
2. SCOPE.....	9
3. TEST EQUIPMENT AND PROCEDURES .....	9
3.1 Test Facility.....	9
3.2 Air Sampling Devices for Measuring Concentration Inside the Suit.....	10
3.3 Procedures for Challenging the Mark IV and Kappler CPF3.....	11
3.4 Procedures for Removing PSDs .....	13
3.5 Procedures for Analyzing Samples.....	13
3.6 Quality Assurance/Quality Control Procedures .....	13
4. RESULTS AND DISCUSSION.....	14
5. CONCLUSION.....	15
LITERATURE CITED.....	17
APPENDIXES	
A. Method of Analysis .....	19
B. Test Data.....	25

## FIGURES

1. The Mark IV Overgarment .....	8
2. The Kappler CPF3 Protective Suit .....	8
3. Chamber and Clean-Room Layout .....	10
4. Passive Sampling Device.....	11
5. PSD Sample Locations .....	12

## TABLES

1. Mark IV Suit Size Comparison Chart.....	7
2. Activities Performed During MIST Tests .....	12
3. Summary of BRHA Results of the Mark IV .....	14
4. Summary of BRHA Results of the Kappler CPF3 .....	15



## Man In Simulant Testing of the Mark IV and Kappler CPF3 Protective Suits

### 1. INTRODUCTION

Man In Simulant Testing (MIST) was performed to determine the protective capability of the British Mark IV and the Kappler CPF3 suits. This program was funded by the U. S. Army Chemical Stockpile Emergency Preparedness Program (CSEPP).

Extensive modelling has been performed to determine an appropriate method for the evaluation of protection based upon a Body Region Hazard Analysis (BRHA). This method uses actual skin adsorption data from agents and simulants to predict the Minimum Required Exposure Dosage (MRED) an individual must be exposed to in order to produce end-point reactions in the body for systemic (nerve agent) and localized (mustard) exposure to agents.

Tests were performed at the Edgewood Research, Development and Engineering Center (ERDEC)\*. Similar testing has been conducted on various other protective suit ensembles from 1995<sup>1</sup> to the present. A total of five trials, each involving four test participants was conducted on the Mark IV from March to June 1998 and six trials with four test participants on the Kappler CPF3 from May to June 1998.

#### 1.1 Description of the British Mark IV Overgarment

The British Mark IV, referred to as the Suit Protective, NBC No.1 MKIV, DPM, Smock and Trousers, is approved by the British military for operations on a contaminated battlefield. It is constructed of an outer cloth material, and an inner charcoal cloth liner. The smock (jacket) has an integral hood with an elastic band that seals around the mask and is sealed by a zipper covered with a cloth hook and pile strip. The wrists and waist are sealed with hook and pile tightening straps. The trousers have suspenders and hook and pile tightening straps at the ankles (two sets) and at the waist at the front belt position. Standard butyl gloves and the U.S. Army's Green Vinyl Over Boots (GVOs) were worn with the suit during testing. Respiratory protection was provided by a Survivair™ Powered Air Purifying Respirator (PAPR). A butyl rubber hood was worn with the respirator and placed beneath the integral hood of the jacket. A picture of a test participant wearing the Mark IV is shown in Figure 1. Three sizes were used in testing: two small, 12 medium, and 6 large. The specifications for each of these suit sizes are listed in Table 1.

**Table 1. Mark IV Suit Size Comparison Chart**

Nominal Size	NATO Size	Height	Chest	Stock Number
Small	6070/9505	170 cm	100 cm	8415-99-130-6922
Medium	7080/9205	180 cm	100 cm	8415-99-130-6923
Large	8090/0515	190 cm	108 cm	8415-99-130-6924

\* When this work was conducted the U.S. Army Edgewood Chemical Biological Center (ECBC) was known as the U.S. Army Edgewood Research, Development and Engineering Center (ERDEC).



Figure 1. The Mark IV Overgarment

1.2

#### **Description of the Kappler CPF3 Protective Suit**

The Kappler CPF3 (Figure 2) is a one-piece suit with integrated booties and hood. The PAPR respirator and Toxicological Agent Protective (TAP) boots were worn with the suit during testing. Four sizes were used in the tests: six 2XL, nine XL, seven L and two M.



Figure 2. The Kappler CPF3 Protective Suit

## **2. SCOPE**

Testing was conducted according to guidelines set forth by the Joint Services Lightweight Integrated Suit Technology (JSLIST) working group, specifying test methods capable of accurately measuring a protection factor (PF) greater than 1,000 (the maximum PF that could accurately be measured in these tests was approximately 10,000). Passive sampling devices (PSDs) were mounted beneath the clothing of each participant to sample chemical simulant vapors at a rate consistent with the body's uptake rate of agent. The PSD uptake rate had been determined in an earlier JSLIST research study<sup>2</sup>.

In each of the trials conducted with the Mark IV and CPF3, test participants were exposed to a high concentration of methyl salicylate (MeS) vapor. Methyl salicylate, a mustard (HD) agent simulant used by the U.S. Army for more than 50 years, had been selected by the JSLIST working group for use in testing under the JSLIST program<sup>4</sup>. Each trial exposed test participants to an MeS concentration of approximately 50 mg/m<sup>3</sup> in a chamber for 30 minutes while performing a series of exercises.

## **3. TEST EQUIPMENT AND PROCEDURES**

### **3.1 Test Facility**

Testing was conducted in building E5354 of the Edgewood Area of Aberdeen Proving Ground, MD. The exposure chamber is 40 ft by 20 ft by 14 ft high and contains an evaporative-blower vapor generator controlled by a data acquisition system (DAS) with feedback concentration readings generated by a Foxboro Miniature Infra-Red Gas Analyzer (MIRAN<sup>®</sup>). The challenge concentration in the chamber was measured during the exposure period with two MIRAN<sup>®</sup>s. The location of the MIRAN<sup>®</sup>'s sampling points were in front of the chamber in the area where the subjects performed the exercises, and in the rear of the chamber. All MIRAN<sup>®</sup> readings were recorded by the DAS.

A four stage clean-room was erected in a bay area adjacent to the exposure chamber and was used during application and removal of the PSDs. The clean-room consisted of two airlocks and two 16-ft enclosures of the U.S. Army M28 shelter system. The enclosures, made of a chemically resistant plastic material, were pressurized with filtered air from Nuclear, Biological, and Chemical (NBC) filter units of the M28. A 600 cfm unit was used to pressurize the clean room area (Enclosure 4 of Figure 3), and two 200 cfm units were used to pressurize the doffing room area (Enclosure 2 of Figure 3), for a total clean airflow of 1000 cfm. A layout of the test area and apparatus is shown in Figure 3.

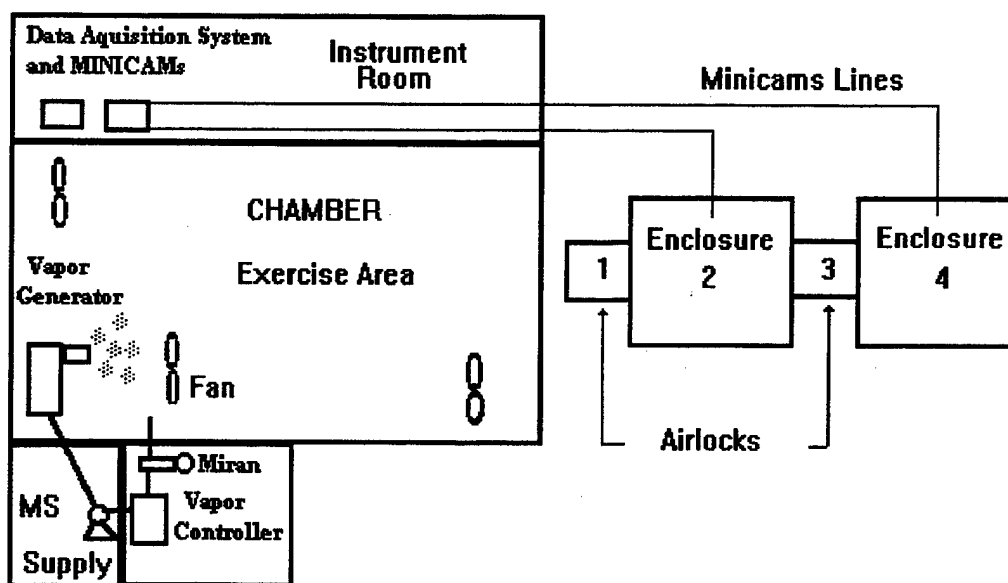


Figure 3. Chamber and Clean-Room Layout

### 3.2 Air Sampling Devices for Measuring Concentration Inside the Suit

PSDs were used to sample MeS vapor beneath the suit (Figure 4). Each PSD contains 40 mg of the purified solid adsorbent material Tenax<sup>®</sup> TA in a small plastic polyethylene pouch. The MeS vapor diffuses through a layer of polyethylene film and is absorbed by the Tenax<sup>®</sup> TA adsorbent. The sampler flow rate is governed by the (known) rate of diffusion (molecular transport) through the polyethylene film.

The sampler flow rate for the PSDs has been determined experimentally<sup>1</sup> to average 14.63 cm<sup>3</sup>/min with a standard deviation of 0.13 cm<sup>3</sup>/min. The adsorption velocity, or uptake rate, of the PSDs (sampler flow rate divided by the effective sampling surface area of 3.78 cm<sup>2</sup>) is 3.86 cm/min; this velocity approximates the rate at which chemical agent vapors permeate human skin.

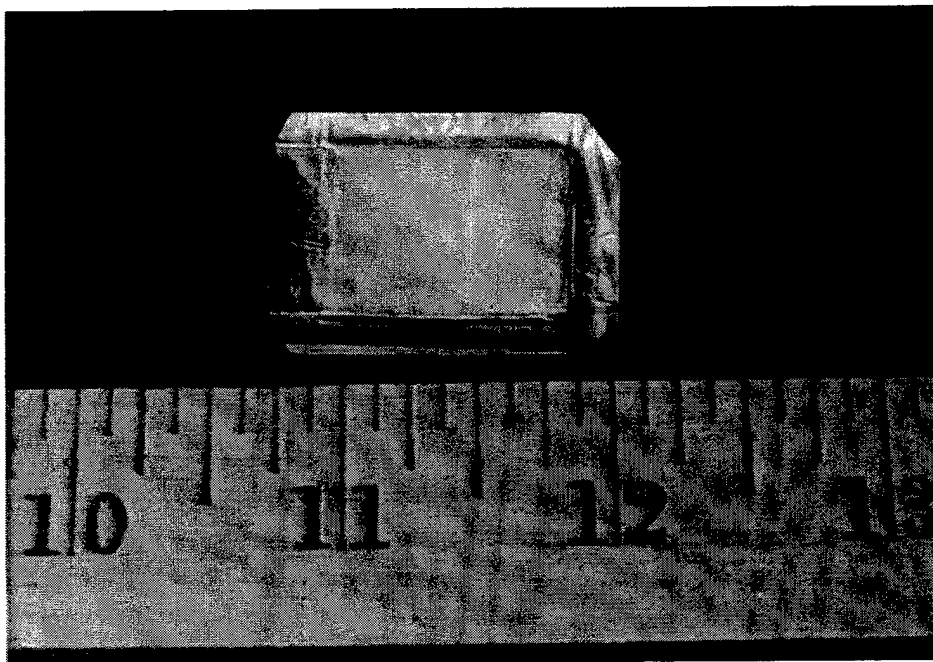


Figure 4. Passive Sampling Device

### 3.3 Procedures for Challenging the Mark IV and Kappler CPF3

PSDs were placed on the skin or underclothing of each test participant in the 17 locations depicted in Figure 5.

The clean room was pressurized with filtered air for at least 14 hours before each test, to minimize the potential for contamination of the PSDs by trace amounts of MeS in the air during donning of the suits. The clean room air was monitored throughout the entire test period using Miniature Automatic Continuous Air Monitoring Systems (MINICAMs™). In addition, three PSDs were opened in the clean room (enclosure 4, Figure 3) to measure the amount of background MeS which may have been adsorbed by the PSDs during the donning and doffing periods.

The chamber was prepared by bringing the MeS concentration to  $50 \text{ mg/m}^3$  before the participants exited the clean room. Temperature, relative humidity, and concentration readings in the chamber and in both clean-air rooms were recorded on the DAS.

Test participants entered the clean room to have the passive samplers applied by test technicians. After donning their suits the participants were given a final check to ensure proper closure of all the gas tight zippers and an exterior sampler was placed on the outside of the suit.

Once dressed, the participants passed through the transition airlock (enclosure 3 of Figure 3), the doffing room (enclosure 2 of Figure 3) and exited through the entry/exit airlock (enclosure 1 of Figure 3) where they were met by a test technician who escorted them into the chamber. This procedure took approximately five minutes.

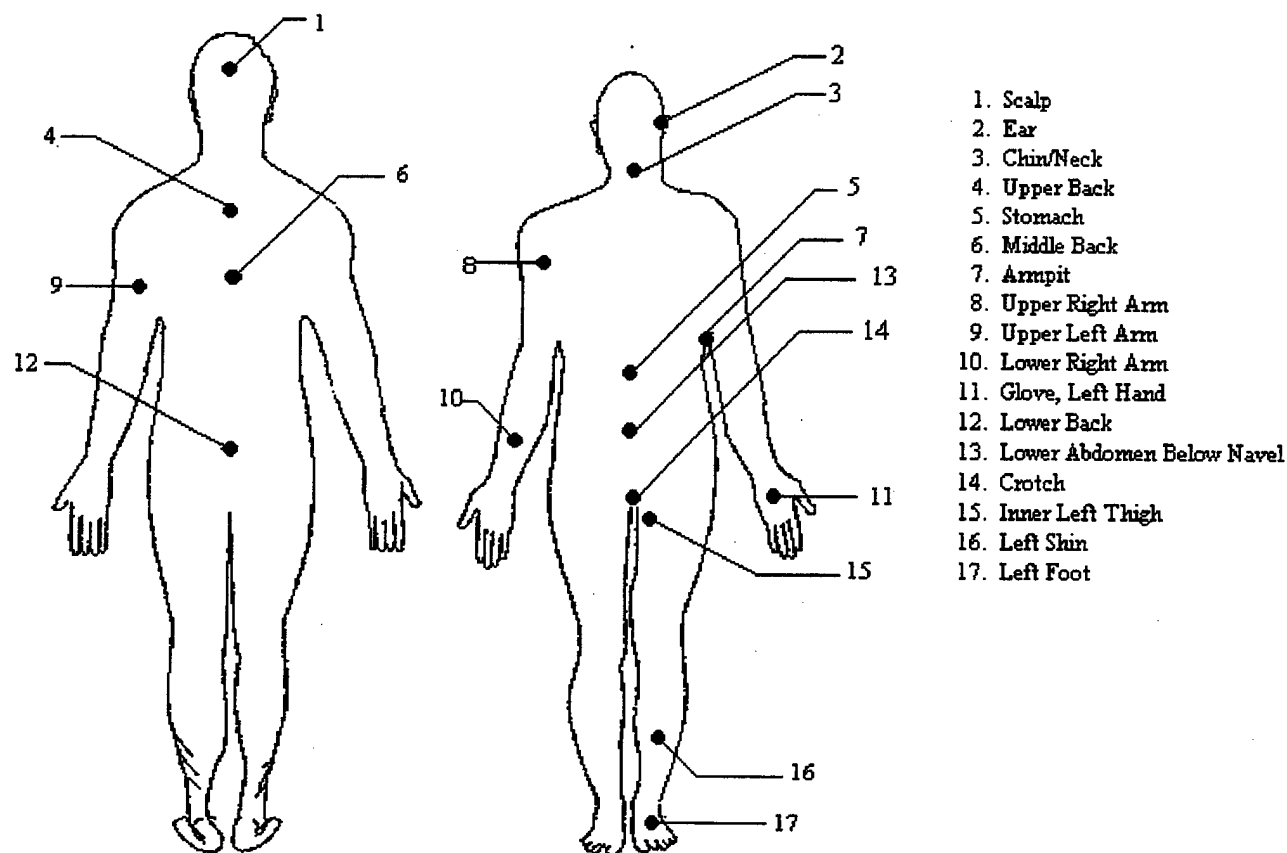


Figure 5. PSD Sample Locations

Once inside the chamber, the subjects performed each of the activities listed in Table 2 for one minute. These exercises were repeated two times during the 30-minute exposure interval.

Table 2. Activities Performed During MIST Tests

Description of Activity
Stationary Run One Minute
Jumping Jacks Two Times
Trunk Twisters Two Times
Bend and Reach Two Times
Back Stretcher Two Times
Bent Knee Leg Lifts Left and Right Ten Times
Vertical Reach and Grasp Left and Right One Minute
Lift Box From Floor to Table and Return One Time
Squat Down, Kneel On One Knee Three Times

### 3.4 Procedures for Removing PSDs

The suit desorbs significant quantities of MeS after exposure to a high concentration of vapors so care was taken to prevent contamination of the samples. The suits were doffed following the procedures outlined below.

- **Enclosure 1 - Entry/Exit Airlock (4 ft by 4 ft).** The participants exited the chamber, entered the airlock and set the purge timer for 5 minutes. They remained fully dressed while airflow through the airlock purged any vapors brought in with them. This period also allowed for some desorption of MeS vapor from the outer surfaces of the ensemble.
- **Enclosure 2 – Doff Room (16 ft by 20 ft).** After the 5 minute purge in enclosure 1 the participants entered the doff room and removed their ensemble with the assistance of a test technician. Suits, overboots, and masks were placed in plastic bags.
- **Enclosure 3 - Transition Airlock (4 ft by 4 ft).** The participants passed through this area from the doff room into the clean room without delay.
- **Enclosure 4 – Clean Room (16 ft by 20 ft).** The PSDs were removed from the participants and placed on data sheets according to their position on the body. The participants then exited the clean room through enclosure 3.

### 3.5 Procedures for Analyzing Samples

After each test, the sorbent was collected from each PSD into labeled stainless steel sorbent tubes. Then the sorbent tubes were analyzed on the Perkin Elmer Autosystem gas chromatographic (GC) system, which includes the Automatic Thermal Tube Desorber (ATD-400) and the Turbochrom data acquisition system. Analysis was performed according to guidelines from the JSLIST research study<sup>3</sup>. The GC system measured and reported the mass of MeS present in each sorbent tube. The maximum PF which could be calculated from PSD data depended upon the duration of the test and the sensitivity of the GC/PSD system.

### 3.6 Quality Assurance/Quality Control Procedures

Tenax<sup>®</sup> TA sorbent provided to the manufacturer of the PSDs was purified and certified clean by an independent laboratory at Pennsylvania State University. The purification process involved supercritical liquid extraction followed by heating and purging with a carrier gas. The adsorbent was then analyzed by a gas chromatograph to ensure adequacy of the cleaning; strict purity protocol requirements were followed.

The MIRANs<sup>®</sup> which controlled the level of MeS vapor in the test chamber were calibrated prior to testing.

#### 4. RESULTS AND DISCUSSION

Results of the testing of the Mark IV and Kappler CPF3 suits are summarized in Tables 3 and 4 respectively. Complete test data is listed in Appendix B.

**Table 3. Summary of BRHA Results of the Mark IV**

Suit No.	Suit Size	Nerve Agent Data			Blister Agent Data	
		Overall PF	Systemic MREDs		Local MRED	Affected Body Region
			(Headache)	(Nausea)		
1	M	307	3074	7684	35659	Scrotum
2	L	240	2401	6002	11268	Scrotum
3	M	378	3779	9448	28431	Scrotum
4	M	363	3632	9081	9539	Scrotum
5	L	249	2485	6213	6531	Scrotum
6	L	453	4529	11322	21863	Scrotum
7	S	348	3478	8695	7867	Scrotum
8	M	379	3793	9481	21177	Scrotum
9	L	668	6678	16696	19083	Scrotum
10	M	449	4492	11229	14838	Scrotum
11	L	386	3861	9652	49219	Scrotum
12	M	292	2922	7304	36818	Scrotum
13	M	337	3372	8431	27389	Scrotum
14	M	218	2182	5456	24464	Ears
15	L	379	3786	9464	20145	Scrotum
16	M	351	3505	8763	28479	Scrotum
17	L	248	2485	6212	6565	Scrotum
18	M	244	2444	6110	17176	Scrotum
19	M	200	2003	5008	6988	Scrotum
20	S	186	1859	4648	9454	Scrotum
Average		304	3044	7610	17963	

The average overall protection factor of the Mark IV measured in these tests was 304 (Table 3). The minimum exposure dosage (Systemic MRED), or the nerve agent dosage required to produce an endpoint reaction, was found to be 3044 mg-min/m<sup>3</sup> for headache and 7610 mg-min/m<sup>3</sup> for nausea. The Localized MRED, the minimum required exposure dosage necessary to produce erythema (reddening of the skin) resulting from mustard agent (HD) exposure, was 17963 mg-min/m<sup>3</sup>.

In comparison, the Kappler CPF3 (Table 4) had an average overall protection factor of 678. The Systemic MRED for headache was 6776 mg-min/m<sup>3</sup> and 16940 mg-min/m<sup>3</sup> for nausea. The Localized MRED (erythema) was found to be 33683 mg-min/m<sup>3</sup>.



**Table 4. Summary of BRHA Results of the Kappler CPF3**

Suit No.	Suit Size	Nerve Agent Data			Blister Agent Data	
		Overall PF	Systemic MREDs		Local MRED	Affected Body Region
			(Headache)	(Nausea)		
1	XL	718	7181	17952	34558	Scrotum
2	XXL	605	6045	15113	97886	Upper Back
3	L	361	3605	9013	9148	Scrotum
4	XL	549	5486	13715	32661	Chin/Neck
5	XXL	621	6212	15530	65969	Scrotum
6	L	692	6924	17311	31809	Scrotum
7	L	658	6576	16439	18876	Scrotum
8	M	488	4880	12200	14823	Scrotum
9	XL	412	4121	10302	31879	Chin/Neck
10	XXL	665	6649	16622	75413	Scrotum
11	L	586	5858	14645	10442	Scrotum
12	XL	660	6604	16509	39386	Scrotum
13	XXL	439	4388	10969	17301	Scrotum
14	XXL	424	4242	10606	23516	Scrotum
15	L	679	6795	16987	30451	Scrotum
16	XL	636	6359	15896	10505	Scrotum
17	M	1919	19193	47983	63781	Chin/Neck
18	XXL	165	1646	4116	16890	Chin/Neck
19	L	293	2933	7334	8545	Scrotum
20	L	692	6922	17306	17175	Scrotum
21	XL	1055	10548	26371	32529	Scrotum
22	XL	928	9277	23192	84569	Chin/Neck
23	XL	484	4839	12098	10935	Scrotum
24	XL	1534	15336	38340	29355	Scrotum
Average		678	6776	16940	33683	

## 5. CONCLUSION

Both the Mark IV and the Kappler CPF3 provided acceptable PFs. The Kappler CPF3, a one-piece ensemble with integral booties, had a higher average overall PF than the Mark IV, which is a two-piece ensemble similar to the U.S. Army's BDO. Overall PFs are dependent on factors such as the number and size of closures and type of respirator worn. Since both suits used the PAPR respirator, the role of closures can be seen in the difference in overall PFs. Additionally, by wearing the hood of the PAPR inside the suit, both the Mark IV and Kappler CPF3 had the exhalation air from the PAPR directed in the suit creating a slight overpressure. This overpressure improves PF by offering resistance against contaminated vapors infiltrating through the suit closures.

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## APPENDIX A-Method of Analysis

### PSD Concentrations and Protection Factors

The concentration of MeS ( $C_{MeS}$ ) sampled by each interior PSD was calculated by dividing the total mass (g) of MeS on each PSD measured in the GC analysis by the product of the sampler flow rate of the PSDs (in/min) multiplied by the test duration of each PSD (minutes) (see equation 1). The average mass from the background PSD samples was subtracted from each sample's mass before calculating the concentration to correct for incidental MeS vapor exposure of the PSDs during donning, doffing, and transfer. Background samples were exposed to the air inside the clean room during the entire interval from the start of PSD application until the sorbent from the PSDs was removed and packed in GC sample tubes. The PSD concentration for each location was calculated using the following equation:

$$C_{MeS} = \frac{(Mass\ of\ MeS\ from\ PSD) - (Mass\ of\ MeS\ from\ Background)}{(Sampler\ Flow\ Rate\ of\ PSD) \times (Exposure\ Time)} \quad [1]$$

Each PSD concentration was converted into a dosage by multiplying by the exposure time. The mean concentration of MeS in the chamber was extracted from MIRAN<sup>®</sup> data, and the total exposure dosage was calculated by multiplying it by the exposure time. This value was used in the calculations of protection factor (PF).

Sampler Location PFs were determined by dividing the exposure dosage by the dosage detected inside the suit at each PSD location. The PF calculation is expressed mathematically in equation 2:

$$PF_{SL} = \frac{Exposure\ Dosage}{(PSD\ Concentration) \times (Exposure\ Time)} \quad [2]$$

PF<sub>SL</sub> values were tabulated for each PSD location. First, the average mass of MeS collected on the background PSDs, plus one standard deviation, was subtracted from the MeS mass collected on each PSD. If the resulting mass was greater than zero, then the analysis methods outlined above were performed. If the resulting mass was less than zero, the PSD was considered not to have sampled any MeS during the exposure time, and the maximum PF for that test was assigned for that PSD location. The maximum PF<sub>SL</sub> for each test was determined by dividing the exposure dosage by the minimum detectable dosage.

The minimum detectable dosage of MeS that can be measured with the combined PSD/gas chromatograph system during these tests was determined from the variability of analyzed PSDs in a study that measured the overall mass of MeS on a set of 25 similarly-handled PSDs. The average mass detected on the variability sample was 34.81 ng with a standard deviation of 6.98 ng. The standard deviation of these PSDs is the value that was used as the smallest mass of MeS detectable by the PSD/GC system.

## Calculation of Overall Protection Factors

The overall PF of each suit was determined by using the Body Region Hazard Analysis (BRHA) process developed by Fedele and Nelson<sup>1</sup>, which is based upon the amount of agent that must be absorbed percutaneously (through the skin) in each of 27 different body areas to produce mean end-point reactions. In the model, the mean end-point reaction is the symptom that occurs in 50% of individuals exposed to the agent dosage. For exposure to nerve agent (GB) the first significant symptom is headache. Reddening of the skin (similar to severe sunburn) is the first mean end-point reaction for exposure to the blister agent, mustard (HD).

The 17 values of  $PF_{SL}$  are used to calculate the Protection Factors for each of the 27 body regions ( $PF_{BR}$ ). This is accomplished by choosing and weighting the sampler locations to represent the body regions as shown in Table A-1.

**Table A-1. Calculating Body Region PF from Sampler Location PF**

Body Region		Sampler Locations Used	Calculation
1	Scalp	1	$BR_1 = SL_1$
2	Ears	2, 18	$BR_2 = (SL_2 + SL_{18})/2$
3	Cheeks & Neck	2, 18	$BR_3 = (SL_2 + SL_{18})/2$
4	Chin & Neck	3	$BR_4 = SL_3$
5	Nape	4	$BR_5 = SL_4$
6	Abdomen	5, 7, 13	$BR_6 = [2(SL_5) + SL_7 + SL_{13}]/4$
7	Back	4, 6, 12, 7	$BR_7 = [2SL_4 + 2SL_6 + 2SL_{12}]/9 + [SL_7/3]$
8	Axillae	7	$BR_8 = SL_7$
9	Upper arms, med.	8	$BR_9 = SL_8$
10	Upper arms, lat.	9	$BR_{10} = SL_9$
11	Elbowfolds	8, 10	$BR_{11} = (SL_8 + SL_{10})/2$
12	Elbows	9, 10	$BR_{12} = (SL_9 + SL_{10})/2$
13	Forearms, volar	10	$BR_{13} = SL_{10}$
14	Forearms, dorsum	10	$BR_{14} = SL_{10}$
15	Hands, dorsum	11	$BR_{15} = SL_{11}$
16	Hands, palmar	11	$BR_{16} = SL_{11}$
17	Buttocks	12	$BR_{17} = SL_{12}$
18	Groin	13, 14	$BR_{18} = (SL_{13} + SL_{14})/2$
19	Scrotum	14	$BR_{19} = SL_{14}$
20	Thighs, ant	15	$BR_{20} = SL_{15}$
21	Thighs, pos	15	$BR_{21} = SL_{15}$
22	Knees	15, 16	$BR_{22} = (SL_{15} + SL_{16})/2$
23	Popliteal Space	15, 16	$BR_{23} = (SL_{15} + SL_{16})/2$
24	Shins	16	$BR_{24} = SL_{16}$
25	Calves	16	$BR_{25} = SL_{16}$
26	Feet, dorsum	17	$BR_{26} = SL_{17}$
27	Feet, plantar	17	$BR_{27} = SL_{17}$

The overall PFs for nerve and blister agents require separate calculations. For nerve agent, the overall PF is based on the PF values and sensitivities for the 27 individual defined

body regions. This approach is used because nerve agents produce a systemic rather than a localized response in the individual. When the overall PF for nerve agents is multiplied by 10 mg-min/m<sup>3</sup> (which is the minimum dosage of the nerve agent (VX or GB) that an unprotected individual must absorb through their skin to develop end-point reactions) the systemic Minimum Required Exposure Dosage (MRED<sub>s</sub>) value is obtained. It is assumed, for this model, that the systemic effects of VX absorbed percutaneously are comparable to those of GB. Quantitative empirical data is available for VX, but it is GB which is the greater vapor hazard, because of its higher volatility.

The initial effects of HD are localized to specific body regions because the skin reacts directly to the HD dosage. The PF for HD is expressed as a localized MRED<sub>HD</sub>. This was calculated by multiplying the PF for each body region by the dosage which is known to produce mean end-point skin reactions. The *lowest* calculated MRED<sub>HD</sub> value, along with the skin area affected, characterizes the protective capability of the suit and areas of susceptibility to HD. A detailed description of both of these methods and equations used to calculate the overall PF using the BRHA process is presented below.

### Systemic Effect - Nerve Agent (GB)

The BRHA process uses the dosage known to be required at each body region to cause a systemic nerve agent effect (end-point reaction). These dosages, known as the "VX dose," are listed in Table A-1. The VX dose for each body region divided into the skin area of that region is called the "A/D Factor. The A/D factor represents the relative sensitivity of each body region to nerve agent exposure. The overall PF of the suit is calculated from the local PFs for each body region and the A/D factor for each body region as shown in equation 3.

$$(OverallPF) = \frac{\sum (A/D)_i}{\sum [(A/D)_i \times (PF)_i]} \quad [3]$$

where PF<sub>i</sub> is the protection factor measured at body region i = 1, 2,... 27, and (A/D)<sub>i</sub> is the A/D Factor at body region i = 1, 2,...27. Because this portion of the Fedele BRHA model was developed using data taken from controlled human exposure to the nerve agent VX, the Overall PF is then multiplied by the minimum dosage of VX to which an unprotected individual must be percutaneously exposed in order to develop specific end-point reactions (symptoms). For the end-point reaction of headache, that dosage is 10 mg-min/m<sup>3</sup>. For the end-point reaction of nausea and vomiting, that dosage is 25 mg-min/m<sup>3</sup>. This product (Equation 4) is called the Systemic Minimum Required Exposure Dosage (MREDs), and it represents the minimum exposure dosage of nerve agent vapor which would produce the end-point reactions in an individual wearing the protective ensemble under test.

$$MRED_s = (OverallPF) \times (10 \text{ mg} - \text{min}/\text{m}^3) \quad [4]$$

### Localized Effect - Blister Agent (HD)

A second calculation procedure from the BRHA process was used to determine the minimum exposure dosages required to cause a specific end-point reaction when the suit wearer is exposed to HD vapor. In this case, the end-point reaction was erythema (reddening of the skin, similar to severe sunburn). Because the minimum dosages of HD which produce erythema are not cumulative and normally affect only the localized body regions exposed, the model predicts MREDs for each body region based upon the PF value and skin sensitivity for each body region. The lowest of these dosages is considered the Minimum Required Exposure Dosage for HD (MRED<sub>HD</sub>) for the ensemble tested.

Listed in Table A-2 are the known Local Exposure Dosages for HD (LED<sub>HD</sub>) used by the model. The LED<sub>HD</sub> values for each body region were multiplied by the PF value for that body region to obtain the MRED required to cause erythema at that body location (Equation 5).

$$MRED_i = (LED_i) \times (PF_i) \quad [5]$$

where LED<sub>i</sub> is the localized exposure dosage for body region  $i = 1, 2, \dots, 27$ , and PF<sub>i</sub> is the protection factor measured at body region  $i = 1, 2, \dots, 27$ . The lowest value is the MRED<sub>HD</sub> for the ensemble tested, and the body region where that value occurs is where erythema would first occur.



**Table A-2. BRHA Model Parameters Used to Calculate MRED**

Body Region		Area, cm <sup>2</sup>	VX Dose, mg	Local Unprotected MRED for HD, mg-min/m <sup>3</sup>
1	Scalp	350	0.76	271
2	Ears	50	0.46	164
3	Cheeks & Neck	100	0.48	171
4	Chin & Neck	200	0.36	129
5	Nape	100	1.72	614
6	Abdomen	2858	2.23	796
7	Back	2540	2.65	946
8	Axillae	200	2.07	739
9	Upper Arms, med.	488	2.80	1000
10	Upper Arms, lat.	706	6.57	2346
11	Elbowfolds	50	2.09	746
12	Elbows	50	2.25	804
13	Forearms, volar	487	2.80	1000
14	Forearms, dorsum	706	6.57	2346
15	Hands, dorsum	200	2.91	1039
16	Hands, palmar	200	9.24	3300
17	Buttocks	953	4.26	1521
18	Groin	300	1.22	436
19	Scrotum	200	0.11	39
20	Thighs, ant	2845	6.57	2346
21	Thighs, pos	1422	4.26	1521
22	Knees	200	7.14	2550
23	Popliteal Space	100	2.09	746
24	Shins	1897	6.57	2346
25	Calves	948	2.80	1000
26	Feet, dorsum	500	6.60	2357
27	Feet, plantar	300	7.14	2550

**Blank**

**APPENDIX B**  
**TEST DATA**

Section 1 - Summary of Results	
Date of Test:	24-Mar-98
Suit No.	1
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.27
Overall PF:	307
MRED (HD), Body Region:	35659 Scrotum
Systemic MRED (VX), Headache:	3074
Systemic MRED (VX), Nausea:	7684
Exposure Dosage, mg-min/m <sup>3</sup> :	1688

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3540
Background Level, ng:	80.32
*Blank Mass*	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	56.56	0.13	3.87	437								
2	Ear	8.79	0.02	0.60	2810								
3	Chin/Neck	81.18	0.18	5.55	304								
4	Upper Back/Nape	42.41	0.10	2.90	582								
5	Abdomen	38.42	0.09	2.63	643								
6	Middle Back	47.08	0.11	3.22	525								
7	Armpit (Axillae)	37.37	0.09	2.55	661								
8	Right Arm, Inner	61.30	0.14	4.19	403								
9	Left Arm, Outer	83.17	0.19	5.68	297								
10	Rt. Forearm, Inner	54.72	0.12	3.74	451								
11	Left Hand/Glove	66.91	0.15	4.57	369								
12	Lower Back	77.04	0.18	5.27	321								
13	Groin	43.88	0.10	3.00	563								
14	Crotch	27.01	0.06	1.85	914								
15	Inner Left Thigh	229.51	0.52	15.69	108								
16	Inner Left Shin	221.79	0.51	15.16	111								
17	Left Foot/Boot	343.66	0.78	23.49	72								
<table><tr><td>Background 1:</td><td>70.99</td></tr><tr><td>Background 2:</td><td>88.01</td></tr><tr><td>Background 3:</td><td>81.96</td></tr><tr><td>Average Background:</td><td>80.32</td></tr></table>						Background 1:	70.99	Background 2:	88.01	Background 3:	81.96	Average Background:	80.32
Background 1:	70.99												
Background 2:	88.01												
Background 3:	81.96												
Average Background:	80.32												

Section 1 - Summary of Results	
Date of Test:	24-Mar-98
Suit No.	2
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.27
Overall PF:	240
MRED (HD), Body Region:	11268 Scrotum
Systemic MRED (VX), Headache:	2401
Systemic MRED (VX), Nausea:	6002
Exposure Dosage, mg-min/m <sup>3</sup> :	1688

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3540
Background Level, ng:	80.32
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	58.12	0.13	3.97	425								
2	Ear	80.02	0.18	5.47	309								
3	Chin/Neck	44.58	0.10	3.05	554								
4	Upper Back/Nape	67.09	0.15	4.59	368								
5	Abdomen	57.68	0.13	3.94	428								
6	Middle Back	135.22	0.31	9.24	183								
7	Armpit (Axillae)	410.98	0.94	28.09	60								
8	Right Arm, Inner	53.97	0.12	3.69	458								
9	Left Arm, Outer	64.95	0.15	4.44	380								
10	Rt. Forearm, Inner	212.54	0.48	14.53	116								
11	Left Hand/Glove	126.01	0.29	8.61	196								
12	Lower Back	129.27	0.29	8.84	191								
13	Groin	113.49	0.26	7.76	218								
14	Crotch	85.48	0.19	5.84	289								
15	Inner Left Thigh	92.02	0.21	6.29	268								
16	Inner Left Shin	140.47	0.32	9.60	176								
17	Left Foot/Boot	267.00	0.61	18.25	92								
<table><tr><td>Background 1:</td><td>70.99</td></tr><tr><td>Background 2:</td><td>88.01</td></tr><tr><td>Background 3:</td><td>81.96</td></tr><tr><td>Average Background:</td><td>80.32</td></tr></table>						Background 1:	70.99	Background 2:	88.01	Background 3:	81.96	Average Background:	80.32
Background 1:	70.99												
Background 2:	88.01												
Background 3:	81.96												
Average Background:	80.32												

Section 1 - Summary of Results	
Date of Test:	24-Mar-98
Suit No.	3
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.64
Overall PF:	378
MRED (HD), Body Region:	28431 Scrotum
Systemic MRED (VX), Headache:	3779
Systemic MRED (VX), Nausea:	9448
Exposure Dosage, mg-min/m <sup>3</sup> :	1699

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3563
Background Level, ng:	80.32
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	44.73	0.10	3.06	556								
2	Ear	47.19	0.11	3.23	527								
3	Chin/Neck	26.72	0.06	1.83	930								
4	Upper Back/Nape	125.74	0.29	8.59	198								
5	Abdomen	58.85	0.13	4.02	422								
6	Middle Back	30.03	0.07	2.05	828								
7	Armpit (Axillae)	58.85	0.13	4.02	422								
8	Right Arm, Inner	28.33	0.06	1.94	877								
9	Left Arm, Outer	90.00	0.21	6.15	276								
10	Rt. Forearm, Inner	258.80	0.59	17.69	96								
11	Left Hand/Glove	93.69	0.21	6.40	265								
12	Lower Back	38.75	0.09	2.65	641								
13	Groin	29.89	0.07	2.04	832								
14	Crotch	34.10	0.08	2.33	729								
15	Inner Left Thigh	61.44	0.14	4.20	405								
16	Inner Left Shin	216.68	0.49	14.81	115								
17	Left Foot/Boot	78.75	0.18	5.38	316								
<table><tr><td>Background 1:</td><td>70.99</td></tr><tr><td>Background 2:</td><td>88.01</td></tr><tr><td>Background 3:</td><td>81.96</td></tr><tr><td>Average Background:</td><td>80.32</td></tr></table>						Background 1:	70.99	Background 2:	88.01	Background 3:	81.96	Average Background:	80.32
Background 1:	70.99												
Background 2:	88.01												
Background 3:	81.96												
Average Background:	80.32												

Section 1 - Summary of Results	
Date of Test:	24-Mar-98
Suit No.	4
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.84
Overall PF:	363
MRED (HD), Body Region:	9539 Scrotum
Systemic MRED (VX), Headache:	3632
Systemic MRED (VX), Nausea:	9081
Exposure Dosage, mg-min/m <sup>3</sup> :	1699

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3563
Background Level, ng:	80.32
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	46.36	0.11	3.17	536								
2	Ear	48.60	0.11	3.32	512								
3	Chin/Neck	38.68	0.09	2.64	643								
4	Upper Back/Nape	75.44	0.17	5.16	330								
5	Abdomen	30.96	0.07	2.12	803								
6	Middle Back	32.79	0.07	2.24	758								
7	Armpit (Axillae)	32.79	0.07	2.24	758								
8	Right Arm, Inner	31.13	0.07	2.13	799								
9	Left Arm, Outer	10.11	0.02	0.69	2459								
10	Rt. Forearm, Inner	73.01	0.17	4.99	340								
11	Left Hand/Glove	127.65	0.29	8.73	195								
12	Lower Back	69.94	0.16	4.78	355								
13	Groin	20.96	0.05	1.43	1186								
14	Crotch	101.64	0.23	6.95	245								
15	Inner Left Thigh	130.78	0.30	8.94	190								
16	Inner Left Shin	94.27	0.21	6.44	264								
17	Left Foot/Boot	79.69	0.18	5.45	312								
<table><tr><td>Background 1:</td><td>70.99</td></tr><tr><td>Background 2:</td><td>88.01</td></tr><tr><td>Background 3:</td><td>81.96</td></tr><tr><td>Average Background:</td><td>80.32</td></tr></table>						Background 1:	70.99	Background 2:	88.01	Background 3:	81.96	Average Background:	80.32
Background 1:	70.99												
Background 2:	88.01												
Background 3:	81.96												
Average Background:	80.32												

Section 1 - Summary of Results	
Date of Test:	26-Mar-98
Suit No.	5
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.59
Overall PF:	249
MRED (HD), Body Region:	6531 Scrotum
Systemic MRED (VX), Headache:	2485
Systemic MRED (VX), Nausea:	6213
Exposure Dosage, mg-min/m <sup>3</sup> :	1638

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3434
Background Level, ng:	62.22
*Blank Mass*	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	18.87	0.04	1.29	1270
2	Ear	150.12	0.34	10.26	160
3	Chin/Neck	37.84	0.09	2.59	633
4	Upper Back/Nape	2.81	0.01	0.19	8527
5	Abdomen	52.03	0.12	3.56	460
6	Middle Back	15.00	0.03	1.03	1597
7	Armpit (Axillae)	158.48	0.36	10.83	151
8	Right Arm, Inner	109.55	0.25	7.49	219
9	Left Arm, Outer	22.02	0.05	1.51	1088
10	Rt. Forearm, Inner	176.91	0.40	12.09	135
11	Left Hand/Glove	1821.59	4.15	124.51	13
12	Lower Back	8.85	0.02	0.60	2707
13	Groin	24.57	0.06	1.68	975
14	Crotch	143.08	0.33	9.78	167
15	Inner Left Thigh	12.44	0.03	0.85	1926
16	Inner Left Shin	204.18	0.47	13.96	117
17	Left Foot/Boot	57.05	0.13	3.90	420

Background 1:	60.31
Background 2:	64.93
Background 3:	61.42
Average Background:	62.22



Section 1 - Summary of Results	
Date of Test:	26-Mar-98
Suit No.	6
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.59
Overall PF:	453
MRED (HD), Body Region:	21863 Scrotum
Systemic MRED (VX), Headache:	4529
Systemic MRED (VX), Nausea:	11322
Exposure Dosage, mg-min/m <sup>3</sup> :	1638

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3434
Background Level, ng:	62.22
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	54.90	0.13	3.75	436
2	Ear	59.26	0.14	4.05	404
3	Chin/Neck	62.61	0.14	4.28	383
4	Upper Back/Nape	67.10	0.15	4.59	357
5	Abdomen	75.33	0.17	5.15	318
6	Middle Back	42.78	0.10	2.92	560
7	Ampit (Axillae)	36.70	0.08	2.51	653
8	Right Arm, Inner	36.91	0.08	2.52	649
9	Left Arm, Outer	56.77	0.13	3.88	422
10	Rt. Forearm, Inner	49.34	0.11	3.37	486
11	Left Hand/Glove	78.27	0.18	5.35	306
12	Lower Back	48.78	0.11	3.33	491
13	Groin	37.00	0.08	2.53	648
14	Crotch	42.74	0.10	2.92	561
15	Inner Left Thigh	50.82	0.12	3.47	471
16	Inner Left Shin	86.71	0.20	5.93	276
17	Left Foot/Boot	115.99	0.26	7.93	207

Background 1:	60.31
Background 2:	64.93
Background 3:	61.42
Average Background:	62.22

Background 1:	60.31
Background 2:	64.93
Background 3:	61.42
Average Background:	62.22

Section 1 - Summary of Results		
Date of Test:	26-Mar-98	
Suit No.	7	
Size:	S	
Test Participant:	Identify Subj.	
Configuration:	Mark IV	
Duration of Test, min:	30	
Mean Agent Challenge, mg/m <sup>3</sup> :	54.77	
Overall PF:	348	
MRED (HD), Body Region:	7867	Scrotum
Systemic MRED (VX), Headache:	3478	
Systemic MRED (VX), Nausea:	8695	
Exposure Dosage, mg-min/m <sup>3</sup> :	1643	

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3446
Background Level, ng:	62.22
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	53.73	0.12	3.67	447
2	Ear	103.62	0.24	7.08	232
3	Chin/Neck	22.23	0.05	1.52	1081
4	Upper Back/Nape	81.73	0.19	5.59	294
5	Abdomen	120.73	0.28	8.25	199
6	Middle Back	179.06	0.41	12.24	134
7	Armpit (Axillae)	148.27	0.34	10.13	162
8	Right Arm, Inner	19.56	0.04	1.34	1229
9	Left Arm, Outer	17.82	0.04	1.22	1349
10	Rt. Forearm, Inner	40.14	0.09	2.74	599
11	Left Hand/Glove	16.21	0.04	1.11	1483
12	Lower Back	25.77	0.06	1.76	933
13	Groin	10.06	0.02	0.69	2390
14	Crotch	119.17	0.27	8.15	202
15	Inner Left Thigh	109.82	0.25	7.51	219
16	Inner Left Shin	50.27	0.11	3.44	478
17	Left Foot/Boot	213.54	0.49	14.60	113
<div><div>Background 1: 60.31</div><div>Background 2: 64.93</div><div>Background 3: 61.42</div><div>Average Background: 62.22</div></div>					

## Appendix B

## Section 1 - Summary of Results

Date of Test:	26-Mar-98
Suit No.	8
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.77
Overall PF:	379
MRED (HD), Body Region:	21177
Systemic MRED (VX), Headache:	3793
Systemic MRED (VX), Nausea:	9481
Exposure Dosage, mg-min/m <sup>3</sup> :	1643
Scrotum	

## Section 2 - Factors, Calculations and Notes

Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3446
Background Level, ng:	62.22
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

## Section 3 - PSD Data, Calculations and Results

PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	49.19	0.11	3.36	489
2	Ear	56.88	0.13	3.89	423
3	Chin/Neck	52.10	0.12	3.56	461
4	Upper Back/Nape	48.17	0.11	3.29	499
5	Abdomen	38.21	0.09	2.61	629
6	Middle Back	40.02	0.09	2.74	601
7	Amplitt (Axillae)	41.45	0.09	2.83	580
8	Right Arm, Inner	47.02	0.11	3.21	511
9	Left Arm, Outer	56.35	0.13	3.85	427
10	Rt. Forearm, Inner	50.48	0.12	3.45	476
11	Left Hand/Glove	118.08	0.27	8.07	204
12	Lower Back	29.55	0.07	2.02	813
13	Groin	39.09	0.09	2.67	615
14	Crotch	44.27	0.10	3.03	543
15	Inner Left Thigh	46.27	0.11	3.16	520
16	Inner Left Shin	265.03	0.60	18.12	91
17	Left Foot/Boot	139.15	0.32	9.51	173

Background 1:	60.31
Background 2:	64.93
Background 3:	61.42
Average Background:	62.22

Section 1 - Summary of Results	
Date of Test:	31-Mar-98
Suit No.	9
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.71
Overall PF:	668
MRED (HD), Body Region:	19083 Scrotum
Systemic MRED (VX), Headache:	6878
Systemic MRED (VX), Nausea:	16696
Exposure Dosage, mg-min/m <sup>3</sup> :	1701

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3568
Background Level, ng:	90.67
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results						
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location	
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD		
1	Scalp	12.57	0.03	0.86	1979	
2	Ear	39.93	0.09	2.73	623	
3	Chin/Neck	48.65	0.11	3.33	512	
4	Upper Back/Nape	14.70	0.03	1.01	1693	
5	Abdomen	33.65	0.08	2.30	740	
6	Middle Back	26.12	0.06	1.79	953	
7	Arm pit (Axillae)	46.20	0.11	3.16	539	
8	Right Arm, Inner	19.60	0.04	1.34	1270	
9	Left Arm, Outer	51.64	0.12	3.53	482	
10	Rt. Forearm, Inner	18.42	0.04	1.26	1351	
11	Left Hand/Glove	85.90	0.20	5.87	290	
12	Lower Back	17.22	0.04	1.18	1445	
13	Groin	19.64	0.04	1.34	1267	
14	Crotch	50.86	0.12	3.48	489	
15	Inner Left Thigh	22.78	0.05	1.56	1092	
16	Inner Left Shin	44.06	0.10	3.01	565	
17	Left Foot/Boot	198.57	0.45	13.57	125	

Background 1:	89.74
Background 2:	91.42
Background 3:	90.84
Average Background:	90.67

Section 1 - Summary of Results	
Date of Test:	31-Mar-98
Suit No.	10
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.71
Overall PF:	449
MRED (HD), Body Region:	14838 Scrotum
Systemic MRED (VX), Headache:	4492
Systemic MRED (VX), Nausea:	11229
Exposure Dosage, mg-min/m <sup>3</sup> :	1701

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3568
Background Level, ng:	90.67
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	36.52	0.08	2.50	681								
2	Ear	31.86	0.07	2.18	781								
3	Chin/Neck	18.50	0.04	1.26	1345								
4	Upper Back/Nape	24.66	0.06	1.69	1009								
5	Abdomen	9.62	0.02	0.66	2586								
6	Middle Back	45.12	0.10	3.08	552								
7	Armpit (Axillae)	202.18	0.46	13.82	123								
8	Right Arm, Inner	29.45	0.07	2.01	845								
9	Left Arm, Outer	3.02	0.01	0.21	8232								
10	Rt. Forearm, Inner	17.14	0.04	1.17	1452								
11	Left Hand/Glove	395.57	0.90	27.04	63								
12	Lower Back	4.04	0.01	0.28	6155								
13	Groin	10.04	0.02	0.69	2478								
14	Crotch	65.41	0.15	4.47	380								
15	Inner Left Thigh	207.73	0.47	14.20	120								
16	Inner Left Shin	26.09	0.06	1.78	954								
17	Left Foot/Boot	201.13	0.46	13.75	124								
<table><tr><td>Background 1:</td><td>89.74</td></tr><tr><td>Background 2:</td><td>91.42</td></tr><tr><td>Background 3:</td><td>90.84</td></tr><tr><td>Average Background:</td><td>90.67</td></tr></table>						Background 1:	89.74	Background 2:	91.42	Background 3:	90.84	Average Background:	90.67
Background 1:	89.74												
Background 2:	91.42												
Background 3:	90.84												
Average Background:	90.67												

Section 1 - Summary of Results	
Date of Test:	31-Mar-98
Suit No.	11
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	57.00
Overall PF:	386
MRED (HD), Body Region:	49219 Scrotum
Systemic MRED (VX), Headache:	3861
Systemic MRED (VX), Nausea:	9652
Exposure Dosage, mg-min/m <sup>3</sup> :	1710

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3586
Background Level, ng:	90.67
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	55.24	0.13	3.78	453
2	Ear	67.02	0.15	4.58	373
3	Chin/Neck	60.49	0.14	4.13	414
4	Upper Back/Nape	25.38	0.06	1.74	986
5	Abdomen	40.36	0.09	2.76	620
6	Middle Back	69.07	0.16	4.72	362
7	Armpit (Axillae)	2.59	0.01	0.18	9647
8	Right Arm, Inner	48.03	0.11	3.28	521
9	Left Arm, Outer	47.07	0.11	3.22	531
10	Rt. Forearm, Inner	132.44	0.30	9.05	189
11	Left Hand/Glove	73.77	0.17	5.04	339
12	Lower Back	31.58	0.07	2.16	792
13	Groin	41.60	0.09	2.84	601
14	Crotch	19.82	0.05	1.35	1262
15	Inner Left Thigh	62.86	0.14	4.30	398
16	Inner Left Shin	371.45	0.85	25.39	67
17	Left Foot/Boot	334.39	0.76	22.86	75

Background 1:	89.74
Background 2:	91.42
Background 3:	90.84
Average Background:	90.67

Section 1 - Summary of Results					
Date of Test:	31-Mar-98				
Suit No.	12				
Size:	M				
Test Participant:	Identify Subj.				
Configuration:	Mark IV				
Duration of Test, min:	30				
Mean Agent Challenge, mg/m <sup>3</sup> :	57.00				
Overall PF:	292				
MRED (HD), Body Region:	36818 Scrotum				
Systemic MRED (VX), Headache:	2922				
Systemic MRED (VX), Nausea:	7304				
Exposure Dosage, mg-min/m <sup>3</sup> :	1710				

Section 2 - Factors, Calculations and Notes			
Sampler Flow Rate, cm <sup>3</sup> /min	14.63		
Min GC-Detectable Mass, ng:	6.98		
Min GC-Detectable Concentration:	0.016		
Maximum Measureable PF:	3586		
Background Level, ng:	90.67		
*Blank Mass*	34.8065		
Avg Non-MS Peak	0.00		
BBL	Below Background Level		

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-	PF at PSD
		Corrected for Background	Mean Local Concentration at PSD	min/m <sup>3</sup> Local Dosage at PSD	
1	Scalp	54.91	0.13	3.75	456
2	Ear	61.88	0.14	4.23	404
3	Chin/Neck	25.92	0.06	1.77	965
4	Upper Back/Nape	116.30	0.26	7.95	215
5	Abdomen	83.19	0.19	5.69	301
6	Middle Back	28.90	0.07	1.98	866
7	Armpit (Axillae)	35.81	0.08	2.45	699
8	Right Arm, Inner	41.71	0.10	2.85	600
9	Left Arm, Outer	112.92	0.26	7.72	222
10	Rt. Forearm, Inner	31.40	0.07	2.15	797
11	Left Hand/Glove	138.81	0.32	9.49	180
12	Lower Back	31.71	0.07	2.17	789
13	Groin	34.70	0.08	2.37	721
14	Crotch	5.45	0.01	0.37	4588
15	Inner Left Thigh	28.80	0.07	1.97	869
16	Inner Left Shin	679.49	1.55	46.45	37
17	Left Foot/Boot	269.08	0.61	18.39	93

Background 1:	89.74
Background 2:	91.42
Background 3:	90.84
Average Background:	90.67

Section 1 - Summary of Results	
Date of Test:	2-Apr-98
Suit No.	13
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	57.24
Overall PF:	337
MRED (HD), Body Region:	27389 Scrotum
Systemic MRED (VX), Headache:	3372
Systemic MRED (VX), Nausea:	8431
Exposure Dosage, mg-min/m <sup>3</sup> :	1717

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3601
Background Level, ng:	63.81
*Blank Mass*	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	35.54	0.08	2.43	707								
2	Ear	13.02	0.03	0.89	1929								
3	Chin/Neck	40.95	0.09	2.80	613								
4	Upper Back/Nape	50.21	0.11	3.43	500								
5	Abdomen	38.14	0.09	2.61	659								
6	Middle Back	63.56	0.14	4.34	395								
7	Armpit (Axillae)	51.46	0.12	3.52	488								
8	Right Arm, Inner	56.20	0.13	3.84	447								
9	Left Arm, Outer	37.09	0.08	2.53	677								
10	Rt. Forearm, Inner	45.91	0.10	3.14	547								
11	Left Hand/Glove	117.74	0.27	8.05	213								
12	Lower Back	68.61	0.16	4.69	366								
13	Groin	48.13	0.11	3.29	522								
14	Crotch	35.77	0.08	2.44	702								
15	Inner Left Thigh	82.17	0.19	5.62	306								
16	Inner Left Shin	310.19	0.71	21.20	81								
17	Left Foot/Boot	500.19	1.14	34.19	50								
<table><tr><td>Background 1:</td><td>69.70</td></tr><tr><td>Background 2:</td><td>65.07</td></tr><tr><td>Background 3:</td><td>56.66</td></tr><tr><td>Average Background:</td><td>63.81</td></tr></table>						Background 1:	69.70	Background 2:	65.07	Background 3:	56.66	Average Background:	63.81
Background 1:	69.70												
Background 2:	65.07												
Background 3:	56.66												
Average Background:	63.81												



Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg- min/m <sup>3</sup>	PF at PSD	Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD										
1	Scalp	32.86	0.07	2.25	765									
2	Ear	168.40	0.38	11.51	149									
3	Chin/Neck	37.47	0.09	2.56	670									
4	Upper Back/Nape	46.29	0.11	3.16	543									
5	Abdomen	43.47	0.10	2.97	578									
6	Middle Back	41.70	0.10	2.85	602									
7	Armpit (Axillae)	37.10	0.08	2.54	677									
8	Right Arm, Inner	49.80	0.11	3.40	504									
9	Left Arm, Outer	46.65	0.11	3.19	539									
10	Rt. Forearm, Inner	48.14	0.11	3.29	522									
11	Left Hand/Glove	97.58	0.22	6.67	257									
12	Lower Back	58.76	0.13	4.02	427									
13	Groin	34.80	0.08	2.38	722									
14	Crotch	35.23	0.08	2.41	713									
15	Inner Left Thigh	35.29	0.08	2.41	712									
16	Inner Left Shin	966.41	2.20	66.06	26									
17	Left Foot/Boot	234.61	0.53	16.04	107									
<table><tr><td>Background 1:</td><td>69.70</td></tr><tr><td>Background 2:</td><td>65.07</td></tr><tr><td>Background 3:</td><td>56.66</td></tr><tr><td>Average Background:</td><td>63.81</td></tr></table>							Background 1:	69.70	Background 2:	65.07	Background 3:	56.66	Average Background:	63.81
Background 1:	69.70													
Background 2:	65.07													
Background 3:	56.66													
Average Background:	63.81													

Section 1 - Summary of Results	
Date of Test:	2-Apr-98
Suit No.	14
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	57.24
Overall PF:	218
MRED (HD), Body Region:	24464 Ears
Systemic MRED (VX), Headache:	2182
Systemic MRED (VX), Nausea:	5456
Exposure Dosage, mg-min/m <sup>3</sup> :	1717

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3601
Background Level, ng:	63.81
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 1 - Summary of Results	
Date of Test:	2-Apr-98
Suit No.	15
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	28
Mean Agent Challenge, mg/m <sup>3</sup> :	57.24
Overall PF:	379
MRED (HD), Body Region:	20145 Scrotum
Systemic MRED (VX), Headache:	3786
Systemic MRED (VX), Nausea:	9464
Exposure Dosage, mg-min/m <sup>3</sup> :	1603

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.017
Maximum Measureable PF:	3361
Background Level, ng:	63.81
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	34.30	0.08	2.34	684
2	Ear	53.56	0.13	3.66	438
3	Chin/Neck	50.47	0.12	3.45	465
4	Upper Back/Nape	13.19	0.03	0.90	1777
5	Abdomen	36.01	0.09	2.46	651
6	Middle Back	8.43	0.02	0.58	2781
7	Armpit (Axillae)	13.05	0.03	0.89	1797
8	Right Arm, Inner	54.37	0.13	3.72	431
9	Left Arm, Outer	39.16	0.10	2.68	599
10	Rt. Forearm, Inner	50.43	0.12	3.45	465
11	Left Hand/Glove	85.58	0.21	5.85	274
12	Lower Back	59.38	0.14	4.06	395
13	Groin	45.99	0.11	3.14	510
14	Crotch	45.39	0.11	3.10	517
15	Inner Left Thigh	94.26	0.23	6.44	249
16	Inner Left Shin	229.06	0.56	15.66	102
17	Left Foot/Boot	290.69	0.71	19.87	81

Background 1:	69.70
Background 2:	65.07
Background 3:	56.66
Average Background:	63.81

Section 3 - PSD Data, Calculations and Results						
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-	PF at PSD	Location
		Corrected for Background	Mean Local	min/m3		
			Concentration at PSD	Dosage at PSD		
1	Scalp	32.03	0.08	2.19	732	
2	Ear	12.53	0.03	0.86	1871	
3	Chin/Neck	22.62	0.06	1.55	1037	
4	Upper Back/Nape	29.16	0.07	1.99	804	
5	Abdomen	28.62	0.07	1.96	819	
6	Middle Back	25.39	0.06	1.74	924	
7	Armpit (Axillae)	85.14	0.21	5.82	275	
8	Right Arm, Inner	70.13	0.17	4.79	334	
9	Left Arm, Outer	48.41	0.12	3.31	484	
10	Rt. Forearm, Inner	79.85	0.19	5.46	294	
11	Left Hand/Glove	211.53	0.52	14.46	111	
12	Lower Back	40.18	0.10	2.75	584	
13	Groin	36.19	0.09	2.47	648	
14	Crotch	32.11	0.08	2.19	730	
15	Inner Left Thigh	123.31	0.30	8.43	190	
16	Inner Left Shin	207.60	0.51	14.19	113	
17	Left Foot/Boot	467.15	1.14	31.93	50	

Background 1:	69.70
Background 2:	65.07
Background 3:	56.66
Average Background:	63.81

Section 1 - Summary of Results	
Date of Test:	2-Apr-98
Suit No.	16
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	28
Mean Agent Challenge, mg/m <sup>3</sup> :	57.24
Overall PF:	351
MRED (HD), Body Region:	28479 Scrotum
Systemic MRED (VX), Headache:	3505
Systemic MRED (VX), Nausea:	8763
Exposure Dosage, mg-min/m <sup>3</sup> :	1602.72

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.017
Maximum Measureable PF:	3361
Background Level, ng:	63.81
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 1 - Summary of Results	
Date of Test:	7-Apr-98
Suit No.	17
Size:	L
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	48.77
Overall PF:	248
MRED (HD), Body Region:	6565 Scrotum
Systemic MRED (VX), Headache:	2485
Systemic MRED (VX), Nausea:	6212
Exposure Dosage, mg-min/m <sup>3</sup> :	1463

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3068
Background Level, ng:	139.75
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	64.75	0.15	4.43	331								
2	Ear	66.37	0.15	4.54	322								
3	Chin/Neck	51.66	0.12	3.53	414								
4	Upper Back/Nape	85.11	0.19	5.82	251								
5	Abdomen	63.91	0.15	4.37	335								
6	Middle Back	18.80	0.04	1.29	1138								
7	Armpit (Axillae)	4.89	0.01	0.33	4374								
8	Right Arm, Inner	95.55	0.22	6.53	224								
9	Left Arm, Outer	41.50	0.09	2.84	516								
10	Rt. Forearm, Inner	24.40	0.06	1.67	877								
11	Left Hand/Glove	52.68	0.12	3.60	406								
12	Lower Back	98.57	0.22	6.74	217								
13	Groin	64.40	0.15	4.40	332								
14	Crotch	127.16	0.29	8.69	168								
15	Inner Left Thigh	102.01	0.23	6.97	210								
16	Inner Left Shin	255.50	0.58	17.46	84								
17	Left Foot/Boot	357.21	0.81	24.42	60								
<table><tr><td>Background 1:</td><td>151.56</td></tr><tr><td>Background 2:</td><td>142.18</td></tr><tr><td>Background 3:</td><td>125.50</td></tr><tr><td>Average Background:</td><td>139.75</td></tr></table>						Background 1:	151.56	Background 2:	142.18	Background 3:	125.50	Average Background:	139.75
Background 1:	151.56												
Background 2:	142.18												
Background 3:	125.50												
Average Background:	139.75												

Section 1 - Summary of Results	
Date of Test:	7-Apr-98
Suit No.	18
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	48.77
Overall PF:	244
MRED (HD), Body Region:	17176 Scrotum
Systemic MRED (VX), Headache:	2444
Systemic MRED (VX), Nausea:	6110
Exposure Dosage, mg-min/m <sup>3</sup> :	1463

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3068
Background Level, ng:	139.75
*Blank Mass*	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	83.96	0.19	5.74	255
2	Ear	167.63	0.38	11.46	128
3	Chin/Neck	99.07	0.23	6.77	216
4	Upper Back/Nape	170.47	0.39	11.65	126
5	Abdomen	95.83	0.22	6.55	223
6	Middle Back	55.61	0.13	3.80	385
7	Armpit (Axillae)	57.02	0.13	3.90	375
8	Right Arm, Inner	72.65	0.17	4.97	295
9	Left Arm, Outer	100.29	0.23	6.86	213
10	Rt. Forearm, Inner	208.63	0.48	14.26	103
11	Left Hand/Glove	163.37	0.37	11.17	131
12	Lower Back	75.93	0.17	5.19	282
13	Groin	43.98	0.10	3.01	487
14	Crotch	48.60	0.11	3.32	440
15	Inner Left Thigh	47.50	0.11	3.25	451
16	Inner Left Shin	217.21	0.49	14.85	99
17	Left Foot/Boot	205.16	0.47	14.02	104

Background 1:	151.56
Background 2:	142.18
Background 3:	125.50
Average Background:	139.75

Section 1 - Summary of Results	
Date of Test:	7-Apr-98
Suit No.	19
Size:	M
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	50.53
Overall PF:	200
MRED (HD), Body Region:	6988 Scrotum
Systemic MRED (VX), Headache:	2003
Systemic MRED (VX), Nausea:	5008
Exposure Dosage, mg-min/m <sup>3</sup> :	1516

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3179
Background Level, ng:	139.75
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	48.28	0.11	3.30	459								
2	Ear	59.72	0.14	4.08	371								
3	Chin/Neck	43.68	0.10	2.99	508								
4	Upper Back/Nape	51.74	0.12	3.54	429								
5	Abdomen	42.38	0.10	2.90	523								
6	Middle Back	18.45	0.04	1.26	1202								
7	Armpit (Axillae)	50.31	0.11	3.44	441								
8	Right Arm, Inner	54.28	0.12	3.71	409								
9	Left Arm, Outer	11.19	0.03	0.77	1981								
10	Rt. Forearm, Inner	100.79	0.23	6.89	220								
11	Left Hand/Glove	49.80	0.11	3.40	445								
12	Lower Back	73.14	0.17	5.00	303								
13	Groin	37.67	0.09	2.58	589								
14	Crotch	123.76	0.28	8.46	179								
15	Inner Left Thigh	45.35	0.10	3.10	489								
16	Inner Left Shin	620.93	1.41	42.44	36								
17	Left Foot/Boot	206.27	0.47	14.10	108								
<table><tr><td>Background 1:</td><td>151.56</td></tr><tr><td>Background 2:</td><td>142.18</td></tr><tr><td>Background 3:</td><td>125.50</td></tr><tr><td>Average Background:</td><td>139.75</td></tr></table>						Background 1:	151.56	Background 2:	142.18	Background 3:	125.50	Average Background:	139.75
Background 1:	151.56												
Background 2:	142.18												
Background 3:	125.50												
Average Background:	139.75												

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg- min/m <sup>3</sup>	PF at PSD	Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD										
1	Scalp	62.08	0.14	4.24	357									
2	Ear	21.83	0.05	1.49	1016									
3	Chin/Neck	48.30	0.11	3.30	459									
4	Upper Back/Nape	70.62	0.16	4.83	314									
5	Abdomen	93.64	0.21	6.40	237									
6	Middle Back	58.20	0.13	3.98	381									
7	Armpit (Axillae)	32.37	0.07	2.21	685									
8	Right Arm, Inner	108.83	0.25	7.44	204									
9	Left Arm, Outer	57.98	0.13	3.96	382									
10	Rt. Forearm, Inner	151.56	0.35	10.36	146									
11	Left Hand/Glove	276.47	0.63	18.90	80									
12	Lower Back	162.21	0.37	11.09	137									
13	Groin	34.12	0.08	2.33	650									
14	Crotch	91.48	0.21	6.25	242									
15	Inner Left Thigh	62.32	0.14	4.26	356									
16	Inner Left Shin	646.28	1.47	44.18	34									
17	Left Foot/Boot	258.42	0.59	17.66	86									
<table><tr><td>Background 1:</td><td>151.56</td></tr><tr><td>Background 2:</td><td>142.18</td></tr><tr><td>Background 3:</td><td>125.50</td></tr><tr><td>Average Background:</td><td>139.75</td></tr></table>							Background 1:	151.56	Background 2:	142.18	Background 3:	125.50	Average Background:	139.75
Background 1:	151.56													
Background 2:	142.18													
Background 3:	125.50													
Average Background:	139.75													

Section 1 - Summary of Results	
Date of Test:	7-Apr-98
Suit No.	20
Size:	S
Test Participant:	Identify Subj.
Configuration:	Mark IV
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	50.53
Overall PF:	186
MRED (HD), Body Region:	9454 Scrotum
Systemic MRED (VX), Headache:	1859
Systemic MRED (VX), Nausea:	4648
Exposure Dosage, mg-min/m <sup>3</sup> :	1516

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3179
Background Level, ng:	139.75
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 1 - Summary of Results	
Date of Test:	23-Jun-98
Suit No.	1
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.93
Overall PF:	718
MRED (HD), Body Region:	34558 Scrotum
Systemic MRED (VX), Headache:	7181
Systemic MRED (VX), Nausea:	17952
Exposure Dosage, mg-min/m <sup>3</sup> :	1708

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3581
Background Level, ng:	75.00
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	29.92	0.07	2.04	835
2	Ear	44.89	0.10	3.07	557
3	Chin/Neck	19.45	0.04	1.33	1285
4	Upper Back/Nape	16.23	0.04	1.11	1540
5	Abdomen	29.64	0.07	2.03	843
6	Middle Back	39.85	0.09	2.72	627
7	Armpit (Axillae)	111.13	0.25	7.60	225
8	Right Arm, Inner	63.44	0.14	4.34	394
9	Left Arm, Outer	78.27	0.18	5.35	319
10	Rt. Forearm, Inner	115.64	0.26	7.90	216
11	Left Hand/Glove	108.03	0.25	7.38	231
12	Lower Back	29.74	0.07	2.03	840
13	Groin	18.89	0.04	1.29	1323
14	Crotch	28.20	0.06	1.93	886
15	Inner Left Thigh	18.83	0.04	1.29	1327
16	Inner Left Shin	23.24	0.05	1.59	1075
17	Left Foot/Boot	88.27	0.20	6.03	283

Background 1:	82.41
Background 2:	72.25
Background 3:	70.35
Average Background:	75.00



Section 1 - Summary of Results	
Date of Test:	23-Jun-98
Suit No.	2
Size:	XXL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.93
Overall PF:	605
MRED (HD), Body Region:	97886 Nape
Systemic MRED (VX), Headache:	6045
Systemic MRED (VX), Nausea:	15113
Exposure Dosage, mg-min/m <sup>3</sup> :	1708

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3581
Background Level, ng:	75.00
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	48.33	0.11	3.30	517
2	Ear	27.41	0.06	1.87	912
3	Chin/Neck	32.93	0.08	2.25	759
4	Upper Back/Nape	84.68	0.19	5.79	295
5	Abdomen	63.30	0.14	4.33	395
6	Middle Back	38.52	0.09	2.63	649
7	Armpit (Axillae)	120.17	0.27	8.21	208
8	Right Arm, Inner	100.94	0.23	6.90	248
9	Left Arm, Outer	107.52	0.24	7.35	232
10	Rt. Forearm, Inner	0.00	BBL	BBL	3581
11	Left Hand/Glove	75.89	0.17	5.19	329
12	Lower Back	43.01	0.10	2.94	581
13	Groin	74.48	0.17	5.09	335
14	Crotch	8.28	0.02	0.57	3019
15	Inner Left Thigh	21.65	0.05	1.48	1154
16	Inner Left Shin	56.78	0.13	3.88	440
17	Left Foot/Boot	5.21	0.01	0.36	4799

Background 1:	82.41
Background 2:	72.25
Background 3:	70.35
Average Background:	75.00

# Appendix B

Section 1 - Summary of Results	
Date of Test:	23-Jun-98
Suit No.	3
Size:	L
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.04
Overall PF:	361
MRED (HD), Body Region:	9148 Scrotum
Systemic MRED (VX), Headache:	3605
Systemic MRED (VX), Nausea:	9013
Exposure Dosage, mg-min/m <sup>3</sup> :	1681

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measurable PF:	3526
Background Level, ng:	75.00
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	107.90	0.25	7.38	228								
2	Ear	69.17	0.16	4.73	356								
3	Chin/Neck	36.22	0.08	2.48	679								
4	Upper Back/Nape	34.98	0.08	2.39	703								
5	Abdomen	23.22	0.05	1.59	1059								
6	Middle Back	22.04	0.05	1.51	1116								
7	Armpit (Axillae)	45.95	0.10	3.14	535								
8	Right Arm, Inner	62.53	0.14	4.27	393								
9	Left Arm, Outer	123.88	0.28	8.47	199								
10	Rt. Forearm, Inner	237.89	0.54	16.26	103								
11	Left Hand/Glove	152.42	0.35	10.42	161								
12	Lower Back	52.39	0.12	3.58	470								
13	Groin	35.17	0.08	2.40	699								
14	Crotch	104.86	0.24	7.17	235								
15	Inner Left Thigh	51.20	0.12	3.50	480								
16	Inner Left Shin	44.04	0.10	3.01	559								
17	Left Foot/Boot	35.09	0.08	2.40	701								
<table><tr><td>Background 1:</td><td>82.41</td></tr><tr><td>Background 2:</td><td>72.25</td></tr><tr><td>Background 3:</td><td>70.35</td></tr><tr><td>Average Background:</td><td>75.00</td></tr></table>						Background 1:	82.41	Background 2:	72.25	Background 3:	70.35	Average Background:	75.00
Background 1:	82.41												
Background 2:	72.25												
Background 3:	70.35												
Average Background:	75.00												

Section 1 - Summary of Results	
Date of Test:	23-Jun-98
Suit No.	4
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.04
Overall PF:	549
MRED (HD), Body Region:	32661 Chin & Neck
Systemic MRED (VX), Headache:	5486
Systemic MRED (VX), Nausea:	13715
Exposure Dosage, mg-min/m <sup>3</sup> :	1681

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3526
Background Level, ng:	75.00
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup> Mean Local Concentration at PSD	MeS, mg- min/m <sup>3</sup> Local Dosage at PSD	PF at PSD Location									
		Corrected for Background												
1	Scalp	16.96	0.04	1.16		1451								
2	Ear	35.71	0.08	2.44		689								
3	Chin/Neck	97.15	0.22	6.64		253								
4	Upper Back/Nape	35.62	0.08	2.43		691								
5	Abdomen	71.02	0.16	4.85		346								
6	Middle Back	18.48	0.04	1.26		1331								
7	Armpit (Axillae)	42.65	0.10	2.92		577								
8	Right Arm, Inner	39.71	0.09	2.71		619								
9	Left Arm, Outer	71.48	0.16	4.89		344								
10	Rt. Forearm, Inner	218.69	0.50	14.95		112								
11	Left Hand/Glove	82.00	0.19	5.60		300								
12	Lower Back	50.33	0.11	3.44		489								
13	Groin	53.75	0.12	3.67		458								
14	Crotch	22.04	0.05	1.51		1116								
15	Inner Left Thigh	24.51	0.06	1.68		1004								
16	Inner Left Shin	19.09	0.04	1.30		1289								
17	Left Foot/Boot	52.14	0.12	3.56		472								
<table><tr><td>Background 1:</td><td>82.41</td></tr><tr><td>Background 2:</td><td>72.25</td></tr><tr><td>Background 3:</td><td>70.35</td></tr><tr><td>Average Background:</td><td>75.00</td></tr></table>							Background 1:	82.41	Background 2:	72.25	Background 3:	70.35	Average Background:	75.00
Background 1:	82.41													
Background 2:	72.25													
Background 3:	70.35													
Average Background:	75.00													

Section 1 - Summary of Results		
Date of Test:	25-Jun-98	
Suit No.	5	
Size:	XXL	
Test Participant:	Identify Subj.	
Configuration:	Kappler CPF3	
Duration of Test, min:	30	
Mean Agent Challenge, mg/m <sup>3</sup> :	56.56	
Overall PF:	621	
MRED (HD), Body Region:	65969	Scrotum
Systemic MRED (VX), Headache:	6212	
Systemic MRED (VX), Nausea:	15530	
Exposure Dosage, mg-min/m <sup>3</sup> :	1697	

Section 2 - Factors, Calculations and Notes		
Sampler Flow Rate, cm <sup>3</sup> /min	14.63	
Min GC-Detectable Mass, ng:	6.98	
Min GC-Detectable Concentration:	0.016	
Maximum Measurable PF:	3558	
Background Level, ng:	70.83	
"Blank Mass"	34.8065	
Avg Non-MS Peak	0.00	
BBL	Below Background Level	

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location									
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD										
1	Scalp	28.85	0.07	1.97	861									
2	Ear	26.38	0.06	1.80	941									
3	Chin/Neck	20.93	0.05	1.43	1186									
4	Upper Back/Nape	47.05	0.11	3.22	528									
5	Abdomen	35.90	0.08	2.45	691									
6	Middle Back	25.16	0.06	1.72	987									
7	Armpit (Axillae)	70.23	0.16	4.80	353									
8	Right Arm, Inner	56.22	0.13	3.84	442									
9	Left Arm, Outer	59.31	0.14	4.05	419									
10	Rt. Forearm, Inner	276.67	0.63	18.91	90									
11	Left Hand/Glove	71.80	0.16	4.91	346									
12	Lower Back	33.51	0.08	2.29	741									
13	Groin	50.35	0.11	3.44	493									
14	Crotch	14.68	0.03	1.00	1692									
15	Inner Left Thigh	23.47	0.05	1.60	1058									
16	Inner Left Shin	43.90	0.10	3.00	566									
17	Left Foot/Boot	13.36	0.03	0.91	1859									
<table><tr><td>Background 1:</td><td>74.99</td></tr><tr><td>Background 2:</td><td>65.16</td></tr><tr><td>Background 3:</td><td>72.33</td></tr><tr><td>Average Background:</td><td>70.83</td></tr></table>							Background 1:	74.99	Background 2:	65.16	Background 3:	72.33	Average Background:	70.83
Background 1:	74.99													
Background 2:	65.16													
Background 3:	72.33													
Average Background:	70.83													

Section 1 - Summary of Results	
Date of Test:	25-Jun-98
Suit No.	6
Size:	L
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	56.56
Overall PF:	692
MRED (HD), Body Region:	31809 Scrotum
Systemic MRED (VX), Headache:	6924
Systemic MRED (VX), Nausea:	17311
Exposure Dosage, mg-min/m <sup>3</sup> :	1697

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3558
Background Level, ng:	70.83
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	29.45	0.07	2.01	843								
2	Ear	39.51	0.09	2.70	628								
3	Chin/Neck	24.82	0.06	1.70	1000								
4	Upper Back/Nape	27.39	0.06	1.87	906								
5	Abdomen	51.16	0.12	3.50	485								
6	Middle Back	39.27	0.09	2.68	632								
7	Armpit (Axillae)	68.75	0.16	4.70	361								
8	Right Arm, Inner	52.22	0.12	3.57	475								
9	Left Arm, Outer	71.55	0.16	4.89	347								
10	Rt. Forearm, Inner	84.22	0.19	5.76	295								
11	Left Hand/Glove	84.36	0.19	5.77	294								
12	Lower Back	27.73	0.06	1.90	895								
13	Groin	22.74	0.05	1.55	1092								
14	Crotch	30.44	0.07	2.08	816								
15	Inner Left Thigh	19.10	0.04	1.31	1300								
16	Inner Left Shin	30.67	0.07	2.10	809								
17	Left Foot/Boot	67.55	0.15	4.62	367								
<table><tr><td>Background 1:</td><td>74.99</td></tr><tr><td>Background 2:</td><td>65.16</td></tr><tr><td>Background 3:</td><td>72.33</td></tr><tr><td>Average Background:</td><td>70.83</td></tr></table>						Background 1:	74.99	Background 2:	65.16	Background 3:	72.33	Average Background:	70.83
Background 1:	74.99												
Background 2:	65.16												
Background 3:	72.33												
Average Background:	70.83												

Section 1 - Summary of Results	
Date of Test:	25-Jun-98
Suit No.	7
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	58.00
Overall PF:	658
MRED (HD), Body Region:	18876 Scrotum
Systemic MRED (VX), Headache:	6576
Systemic MRED (VX), Nausea:	16439
Exposure Dosage, mg-min/m <sup>3</sup> :	1740

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3649
Background Level, ng:	70.83
*Blank Mass	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location									
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD										
1	Scalp	10.42	0.02	0.71	2444									
2	Ear	35.26	0.08	2.41	722									
3	Chin/Neck	48.95	0.11	3.35	520									
4	Upper Back/Nape	33.83	0.08	2.31	753									
5	Abdomen	43.54	0.10	2.98	585									
6	Middle Back	12.94	0.03	0.88	1968									
7	Armpit (Axillae)	39.13	0.09	2.67	651									
8	Right Arm, Inner	14.25	0.03	0.97	1787									
9	Left Arm, Outer	39.68	0.09	2.71	642									
10	Rt. Forearm, Inner	144.71	0.33	9.89	176									
11	Left Hand/Glove	76.98	0.18	5.26	331									
12	Lower Back	31.99	0.07	2.19	796									
13	Groin	34.43	0.08	2.35	739									
14	Crotch	52.60	0.12	3.60	484									
15	Inner Left Thigh	13.36	0.03	0.91	1905									
16	Inner Left Shin	18.55	0.04	1.27	1373									
17	Left Foot/Boot	28.90	0.07	1.98	881									
<table><tr><td>Background 1:</td><td>74.99</td></tr><tr><td>Background 2:</td><td>65.16</td></tr><tr><td>Background 3:</td><td>72.33</td></tr><tr><td>Average Background:</td><td>70.83</td></tr></table>							Background 1:	74.99	Background 2:	65.16	Background 3:	72.33	Average Background:	70.83
Background 1:	74.99													
Background 2:	65.16													
Background 3:	72.33													
Average Background:	70.83													

Section 1 - Summary of Results	
Date of Test:	25-Jun-98
Suit No.	8
Size:	M
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	58.00
Overall PF:	488
MRED (HD), Body Region:	14823 Scrotum
Systemic MRED (VX), Headache:	4880
Systemic MRED (VX), Nausea:	12200
Exposure Dosage, mg-min/m <sup>3</sup> :	1740

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3649
Background Level, ng:	70.83
*Blank Mass*	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Dosage at PSD									
1	Scalp	64.06	0.15	4.38	397								
2	Ear	49.35	0.11	3.37	516								
3	Chin/Neck	33.24	0.08	2.27	766								
4	Upper Back/Nape	37.75	0.09	2.58	674								
5	Abdomen	20.83	0.05	1.42	1222								
6	Middle Back	20.99	0.05	1.43	1213								
7	Armpit (Axillae)	43.85	0.10	3.00	581								
8	Right Arm, Inner	60.22	0.14	4.12	423								
9	Left Arm, Outer	76.56	0.17	5.23	333								
10	Rt. Forearm, Inner	214.13	0.49	14.64	119								
11	Left Hand/Glove	114.46	0.26	7.82	222								
12	Lower Back	35.54	0.08	2.43	716								
13	Groin	32.98	0.08	2.25	772								
14	Crotch	66.98	0.15	4.58	380								
15	Inner Left Thigh	35.38	0.08	2.42	720								
16	Inner Left Shin	44.24	0.10	3.02	575								
17	Left Foot/Boot	55.91	0.13	3.82	455								
<table><tr><td>Background 1:</td><td>74.99</td></tr><tr><td>Background 2:</td><td>65.16</td></tr><tr><td>Background 3:</td><td>72.33</td></tr><tr><td>Average Background:</td><td>70.83</td></tr></table>						Background 1:	74.99	Background 2:	65.16	Background 3:	72.33	Average Background:	70.83
Background 1:	74.99												
Background 2:	65.16												
Background 3:	72.33												
Average Background:	70.83												

Section 1 - Summary of Results	
Date of Test:	30-Jun-98
Suit No.	9
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	55.35
Overall PF:	412
MRED (HD), Body Region:	31879 Chin & Neck
Systemic MRED (VX), Headache:	4121
Systemic MRED (VX), Nausea:	10302
Exposure Dosage, mg-min/m <sup>3</sup> :	1661

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3482
Background Level, ng:	53.65
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS. ng	MeS. mg/m <sup>3</sup>	MeS. mg-min/m <sup>3</sup>	PF at PSD Location									
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	PSD	Location								
1	Scalp	116.30	0.26	7.95	209									
2	Ear	78.46	0.18	5.36	310									
3	Chin/Neck	98.30	0.22	6.72	247									
4	Upper Back/Nape	18.81	0.04	1.29	1291									
5	Abdomen	97.50	0.22	6.66	249									
6	Middle Back	82.64	0.19	5.65	294									
7	Armpit (Axillae)	59.52	0.14	4.07	408									
8	Right Arm, Inner	52.99	0.12	3.62	458									
9	Left Arm, Outer	204.72	0.47	13.99	119									
10	Rt. Forearm, Inner	302.12	0.69	20.65	80									
11	Left Hand/Glove	38.35	0.09	2.62	633									
12	Lower Back	106.65	0.24	7.29	228									
13	Groin	132.47	0.30	9.05	183									
14	Crotch	9.38	0.02	0.64	2589									
15	Inner Left Thigh	11.77	0.03	0.80	2063									
16	Inner Left Shin	10.18	0.02	0.70	2386									
17	Left Foot/Boot	12.73	0.03	0.87	1908									
<table><tr><td>Background 1:</td><td>56.06</td></tr><tr><td>Background 2:</td><td>60.26</td></tr><tr><td>Background 3:</td><td>44.62</td></tr><tr><td>Average Background:</td><td>53.65</td></tr></table>							Background 1:	56.06	Background 2:	60.26	Background 3:	44.62	Average Background:	53.65
Background 1:	56.06													
Background 2:	60.26													
Background 3:	44.62													
Average Background:	53.65													



Section 1 - Summary of Results	
Date of Test:	30-Jun-98
Suit No.	10
Size:	XXL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	55.35
Overall PF:	665
MRED (HD), Body Region:	75413 Scrotum
Systemic MRED (VX), Headache:	6649
Systemic MRED (VX), Nausea:	16622
Exposure Dosage, mg-min/m <sup>3</sup> :	1661

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3482
Background Level, ng:	53.65
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	23.78	0.05	1.63	1021								
2	Ear	33.68	0.08	2.30	721								
3	Chin/Neck	28.18	0.06	1.93	862								
4	Upper Back/Nape	21.53	0.05	1.47	1128								
5	Abdomen	52.10	0.12	3.56	466								
6	Middle Back	45.09	0.10	3.08	539								
7	Armpit (Axillae)	98.70	0.22	6.75	246								
8	Right Arm, Inner	54.23	0.12	3.71	448								
9	Left Arm, Outer	108.49	0.25	7.42	224								
10	Rt. Forearm, Inner	218.19	0.50	14.91	111								
11	Left Hand/Glove	57.90	0.13	3.96	420								
12	Lower Back	24.39	0.06	1.67	996								
13	Groin	17.68	0.04	1.21	1374								
14	Crotch	12.56	0.03	0.86	1934								
15	Inner Left Thigh	18.41	0.04	1.26	1319								
16	Inner Left Shin	31.23	0.07	2.13	778								
17	Left Foot/Boot	103.20	0.24	7.05	235								
		<table border="1"> <tr> <td>Background 1:</td> <td>56.06</td> </tr> <tr> <td>Background 2:</td> <td>60.26</td> </tr> <tr> <td>Background 3:</td> <td>44.62</td> </tr> <tr> <td>Average Background:</td> <td>53.65</td> </tr> </table>				Background 1:	56.06	Background 2:	60.26	Background 3:	44.62	Average Background:	53.65
Background 1:	56.06												
Background 2:	60.26												
Background 3:	44.62												
Average Background:	53.65												

Section 1 - Summary of Results	
Date of Test:	30-Jun-98
Suit No.	11
Size:	L
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	28
Mean Agent Challenge, mg/m <sup>3</sup> :	55.79
Overall PF:	586
MRED (HD), Body Region:	10442 Scrotum
Systemic MRED (VX), Headache:	5858
Systemic MRED (VX), Nausea:	14645
Exposure Dosage, mg-min/m <sup>3</sup> :	1562

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.017
Maximum Measureable PF:	3276
Background Level, ng:	53.65
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Dosage at PSD	
1	Scalp	14.39	0.04	0.98	1588
2	Ear	23.45	0.06	1.60	975
3	Chin/Neck	31.15	0.08	2.13	734
4	Upper Back/Nape	41.86	0.10	2.86	546
5	Abdomen	18.77	0.05	1.28	1217
6	Middle Back	31.10	0.08	2.13	735
7	Armpit (Axillae)	35.45	0.09	2.42	645
8	Right Arm, Inner	33.95	0.08	2.32	673
9	Left Arm, Outer	34.51	0.08	2.36	662
10	Rt. Forearm, Inner	39.06	0.10	2.67	585
11	Left Hand/Glove	105.84	0.26	7.23	216
12	Lower Back	12.81	0.03	0.88	1784
13	Groin	14.43	0.04	0.99	1584
14	Crotch	85.36	0.21	5.83	268
15	Inner Left Thigh	36.71	0.09	2.51	623
16	Inner Left Shin	13.71	0.03	0.94	1667
17	Left Foot/Boot	18.42	0.04	1.26	1241

Background 1:	69.70
Background 2:	65.07
Background 3:	56.66
Average Background:	63.81

Section 1 - Summary of Results	
Date of Test:	30-Jun-98
Suit No.	12
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	28
Mean Agent Challenge, mg/m <sup>3</sup> :	55.79
Overall PF:	660
MRED (HD), Body Region:	39386 Scrotum
Systemic MRED (VX), Headache:	6604
Systemic MRED (VX), Nausea:	16509
Exposure Dosage, mg-min/m <sup>3</sup> :	1562.22

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.017
Maximum Measureable PF:	3276
Background Level, ng:	53.65
'Blank Mass'	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	min/m <sup>3</sup> Local Dosage at PSD									
1	Scalp	17.86	0.04	1.22	1279								
2	Ear	39.16	0.10	2.68	584								
3	Chin/Neck	37.96	0.09	2.59	602								
4	Upper Back/Nape	36.99	0.09	2.53	618								
5	Abdomen	27.30	0.07	1.87	837								
6	Middle Back	34.09	0.08	2.33	670								
7	Armpit (Axillae)	44.14	0.11	3.02	518								
8	Right Arm, Inner	42.85	0.10	2.93	533								
9	Left Arm, Outer	54.37	0.13	3.72	420								
10	Rt. Forearm, Inner	65.55	0.16	4.48	349								
11	Left Hand/Glove	221.81	0.54	15.16	103								
12	Lower Back	26.50	0.06	1.81	862								
13	Groin	21.60	0.05	1.48	1058								
14	Crotch	22.63	0.06	1.55	1010								
15	Inner Left Thigh	29.93	0.07	2.05	764								
16	Inner Left Shin	33.15	0.08	2.27	689								
17	Left Foot/Boot	141.12	0.34	9.65	162								
<table><tr><td>Background 1:</td><td>56.06</td></tr><tr><td>Background 2:</td><td>60.26</td></tr><tr><td>Background 3:</td><td>44.62</td></tr><tr><td>Average Background:</td><td>53.65</td></tr></table>						Background 1:	56.06	Background 2:	60.26	Background 3:	44.62	Average Background:	53.65
Background 1:	56.06												
Background 2:	60.26												
Background 3:	44.62												
Average Background:	53.65												

Section 3 - PSD Data, Calculations and Results						
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg- min/m <sup>3</sup>	PF at PSD Location	
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD		
1	Scalp	48.53	0.11	3.32	488	
2	Ear	53.21	0.12	3.64	445	
3	Chin/Neck	51.35	0.12	3.51	462	
4	Upper Back/Nape	56.73	0.13	3.88	418	
5	Abdomen	91.30	0.21	6.24	260	
6	Middle Back	51.86	0.12	3.54	457	
7	Armpit (Axillae)	47.44	0.11	3.24	500	
8	Right Arm, Inner	61.99	0.14	4.24	382	
9	Left Arm, Outer	85.58	0.19	5.85	277	
10	Rt. Forearm, Inner	73.62	0.17	5.03	322	
11	Left Hand/Glove	81.41	0.19	5.56	291	
12	Lower Back	44.55	0.10	3.04	532	
13	Groin	45.12	0.10	3.08	525	
14	Crotch	53.43	0.12	3.65	444	
15	Inner Left Thigh	36.96	0.08	2.53	641	
16	Inner Left Shin	58.35	0.13	3.99	406	
17	Left Foot/Boot	68.36	0.16	4.67	347	

Background 1:	6.31
Background 2:	52.70
Background 3:	65.29
Average Background:	41.43

Section 1 - Summary of Results	
Date of Test:	1-Jul-98
Suit No.	13
Size:	XXL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.00
Overall PF:	439
MRED (HD), Body Region:	17301 Scrotum
Systemic MRED (VX), Headache:	4388
Systemic MRED (VX), Nausea:	10969
Exposure Dosage, mg-min/m <sup>3</sup> :	1620

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3397
Background Level, ng:	41.43
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 1 - Summary of Results	
Date of Test:	1-Jul-98
Suit No.	14
Size:	XXL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.00
Overall PF:	424
MRED (HD), Body Region:	23516 Scrotum
Systemic MRED (VX), Headache:	4242
Systemic MRED (VX), Nausea:	10606
Exposure Dosage, mg-min/m <sup>3</sup> :	1620

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3397
Background Level, ng:	41.43
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD									
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	PSD	Location								
1	Scalp	34.58	0.08	2.36		685								
2	Ear	50.56	0.12	3.46		469								
3	Chin/Neck	34.14	0.08	2.33		694								
4	Upper Back/Nape	34.63	0.08	2.37		684								
5	Abdomen	33.72	0.08	2.30		703								
6	Middle Back	37.01	0.08	2.53		640								
7	Ampit (Axillae)	45.51	0.10	3.11		521								
8	Right Arm, Inner	36.72	0.08	2.51		645								
9	Left Arm, Outer	29.03	0.07	1.98		817								
10	Rt. Forearm, Inner	476.51	1.09	32.57		50								
11	Left Hand/Glove	85.63	0.20	5.85		277								
12	Lower Back	42.33	0.10	2.89		560								
13	Groin	44.67	0.10	3.05		531								
14	Crotch	39.31	0.09	2.69		603								
15	Inner Left Thigh	46.50	0.11	3.18		510								
16	Inner Left Shin	50.07	0.11	3.42		473								
17	Left Foot/Boot	39.84	0.09	2.72		595								
<table><tr><td>Background 1:</td><td>6.31</td></tr><tr><td>Background 2:</td><td>52.70</td></tr><tr><td>Background 3:</td><td>65.29</td></tr><tr><td>Average Background:</td><td>41.43</td></tr></table>							Background 1:	6.31	Background 2:	52.70	Background 3:	65.29	Average Background:	41.43
Background 1:	6.31													
Background 2:	52.70													
Background 3:	65.29													
Average Background:	41.43													

Section 1 - Summary of Results	
Date of Test:	1-Jul-98
Suit No.	15
Size:	L
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.89
Overall PF:	679
MRED (HD), Body Region:	30451 Scrotum
Systemic MRED (VX), Headache:	6795
Systemic MRED (VX), Nausea:	16987
Exposure Dosage, mg-min/m <sup>3</sup> :	1647

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3454
Background Level, ng:	60.35
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	min/m <sup>3</sup> Local Dosage at PSD									
1	Scalp	22.05	0.05	1.51	1093								
2	Ear	30.89	0.07	2.11	780								
3	Chin/Neck	26.10	0.06	1.78	923								
4	Upper Back/Nape	37.97	0.09	2.60	635								
5	Abdomen	15.40	0.04	1.05	1565								
6	Middle Back	22.26	0.05	1.52	1083								
7	Armpit (Axillae)	40.71	0.09	2.78	592								
8	Right Arm, Inner	58.68	0.13	4.01	411								
9	Left Arm, Outer	30.00	0.07	2.05	803								
10	Rt. Forearm, Inner	189.11	0.43	12.93	127								
11	Left Hand/Glove	79.04	0.18	5.40	305								
12	Lower Back	20.08	0.05	1.37	1200								
13	Groin	30.47	0.07	2.08	791								
14	Crotch	30.86	0.07	2.11	781								
15	Inner Left Thigh	19.15	0.04	1.31	1258								
16	Inner Left Shin	45.35	0.10	3.10	531								
17	Left Foot/Boot	78.81	0.18	5.39	306								
<table><tr><td>Background 1:</td><td>151.56</td></tr><tr><td>Background 2:</td><td>142.18</td></tr><tr><td>Background 3:</td><td>125.50</td></tr><tr><td>Average Background:</td><td>139.75</td></tr></table>						Background 1:	151.56	Background 2:	142.18	Background 3:	125.50	Average Background:	139.75
Background 1:	151.56												
Background 2:	142.18												
Background 3:	125.50												
Average Background:	139.75												

Section 1 - Summary of Results	
Date of Test:	1-Jul-98
Suit No.	16
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.89
Overall PF:	636
MRED (HD), Body Region:	10505 Scrotum
Systemic MRED (VX), Headache:	6359
Systemic MRED (VX), Nausea:	15896
Exposure Dosage, mg-min/m <sup>3</sup> :	1647

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3454
Background Level, ng:	60.35
'Blank Mass'	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Dosage at Local PSD	
1	Scalp	15.71	0.04	1.07	1533
2	Ear	41.11	0.09	2.81	586
3	Chin/Neck	7.05	0.02	0.48	3419
4	Upper Back/Nape	38.33	0.09	2.62	629
5	Abdomen	22.35	0.05	1.53	1078
6	Middle Back	13.69	0.03	0.94	1760
7	Armpit (Axillae)	41.91	0.10	2.86	575
8	Right Arm, Inner	20.62	0.05	1.41	1168
9	Left Arm, Outer	14.18	0.03	0.97	1699
10	Rt. Forearm, Inner	77.02	0.18	5.26	313
11	Left Hand/Glove	78.26	0.18	5.35	308
12	Lower Back	19.95	0.05	1.36	1208
13	Groin	21.40	0.05	1.46	1126
14	Crotch	89.45	0.20	6.11	269
15	Inner Left Thigh	8.51	0.02	0.58	2832
16	Inner Left Shin	24.30	0.06	1.66	992
17	Left Foot/Boot	11.96	0.03	0.82	2015

Background 1:	63.07
Background 2:	52.70
Background 3:	65.29
Average Background:	60.35

Section 1 - Summary of Results	
Date of Test:	7-Jul-98
Suit No.	17
Size:	M
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.49
Overall PF:	1919
MRED (HD), Body Region:	Chin & Neck
Systemic MRED (VX), Headache:	19193
Systemic MRED (VX), Nausea:	47983
Exposure Dosage, mg-min/m <sup>3</sup> :	1635

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3428
Background Level, ng:	26.74
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location									
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD										
1	Scalp	5.08	0.01	0.35	4708									
2	Ear	22.25	0.05	1.52	1075									
3	Chin/Neck	48.37	0.11	3.31	494									
4	Upper Back/Nape	155.02	0.35	10.60	154									
5	Abdomen	73.87	0.17	5.05	324									
6	Middle Back	24.86	0.06	1.70	962									
7	Armpit (Axillae)	3.44	0.01	0.24	6952									
8	Right Arm, Inner	20.30	0.05	1.39	1178									
9	Left Arm, Outer	11.75	0.03	0.80	2035									
10	Rt. Forearm, Inner	44.43	0.10	3.04	538									
11	Left Hand/Glove	19.84	0.05	1.36	1205									
12	Lower Back	8.30	0.02	0.57	2881									
13	Groin	2.95	0.01	0.20	8107									
14	Crotch	1.93	0.00	0.13	12391									
15	Inner Left Thigh	2.58	0.01	0.18	9269									
16	Inner Left Shin	4.41	0.01	0.30	5423									
17	Left Foot/Boot	85.52	0.19	5.85	280									
<table><tr><td>Background 1:</td><td>22.68</td></tr><tr><td>Background 2:</td><td>36.30</td></tr><tr><td>Background 3:</td><td>21.24</td></tr><tr><td>Average Background:</td><td>26.74</td></tr></table>							Background 1:	22.68	Background 2:	36.30	Background 3:	21.24	Average Background:	26.74
Background 1:	22.68													
Background 2:	36.30													
Background 3:	21.24													
Average Background:	26.74													



Section 1 - Summary of Results	
Date of Test:	7-Jul-98
Suit No.	18
Size:	XXL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	54.49
Overall PF:	165
MRED (HD), Body Region:	16890 Chin & Neck
Systemic MRED (VX), Headache:	1646
Systemic MRED (VX), Nausea:	4116
Exposure Dosage, mg-min/m <sup>3</sup> :	1635

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3428
Background Level, ng:	26.74
*Blank Mass	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	1.12	0.00	0.08	21353								
2	Ear	182.66	0.42	12.49	131								
3	Chin/Neck	182.66	0.42	12.49	131								
4	Upper Back/Nape	315.86	0.72	21.59	76								
5	Abdomen	405.47	0.92	27.71	59								
6	Middle Back	409.26	0.93	27.97	58								
7	Armpit (Axillae)	304.92	0.69	20.84	78								
8	Right Arm, Inner	96.14	0.22	6.57	249								
9	Left Arm, Outer	158.43	0.36	10.83	151								
10	Rt. Forearm, Inner	418.03	0.95	28.57	57								
11	Left Hand/Glove	190.62	0.43	13.03	125								
12	Lower Back	220.09	0.50	15.04	109								
13	Groin	153.74	0.35	10.51	156								
14	Crotch	44.70	0.10	3.06	535								
15	Inner Left Thigh	5.70	0.01	0.39	4196								
16	Inner Left Shin	22.22	0.05	1.52	1076								
17	Left Foot/Boot	168.47	0.38	11.52	142								
<table><tr><td>Background 1:</td><td>22.68</td></tr><tr><td>Background 2:</td><td>36.30</td></tr><tr><td>Background 3:</td><td>21.24</td></tr><tr><td>Average Background:</td><td>26.74</td></tr></table>						Background 1:	22.68	Background 2:	36.30	Background 3:	21.24	Average Background:	26.74
Background 1:	22.68												
Background 2:	36.30												
Background 3:	21.24												
Average Background:	26.74												

## Appendix B

Section 1 - Summary of Results	
Date of Test:	7-Jul-98
Suit No.	19
Size:	L
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	53.22
Overall PF:	293
MRED (HD), Body Region:	8545 Scrotum
Systemic MRED (VX), Headache:	2933
Systemic MRED (VX), Nausea:	7334
Exposure Dosage, mg-min/m <sup>3</sup> :	1597

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3348
Background Level, ng:	26.74
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	17.95	0.04	1.23	1301								
2	Ear	28.76	0.07	1.97	812								
3	Chin/Neck	212.74	0.48	14.54	110								
4	Upper Back/Nape	43.75	0.10	2.99	534								
5	Abdomen	82.60	0.19	5.65	283								
6	Middle Back	81.16	0.18	5.55	288								
7	Ampit (Axillae)	53.05	0.12	3.63	440								
8	Right Arm, Inner	36.29	0.08	2.48	644								
9	Left Arm, Outer	63.82	0.15	4.36	366								
10	Rt. Forearm, Inner	139.09	0.32	9.51	168								
11	Left Hand/Glove	102.27	0.23	6.99	228								
12	Lower Back	16.40	0.04	1.12	1424								
13	Groin	71.15	0.16	4.86	328								
14	Crotch	106.61	0.24	7.29	219								
15	Inner Left Thigh	21.75	0.05	1.49	1074								
16	Inner Left Shin	132.81	0.30	9.08	176								
17	Left Foot/Boot	23.23	0.05	1.59	1006								
<table><tr><td>Background 1:</td><td>22.68</td></tr><tr><td>Background 2:</td><td>36.30</td></tr><tr><td>Background 3:</td><td>21.24</td></tr><tr><td>Average Background:</td><td>26.74</td></tr></table>						Background 1:	22.68	Background 2:	36.30	Background 3:	21.24	Average Background:	26.74
Background 1:	22.68												
Background 2:	36.30												
Background 3:	21.24												
Average Background:	26.74												

Section 1 - Summary of Results	
Date of Test:	7-Jul-98
Suit No.	20
Size:	L
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	53.22
Overall PF:	692
MRED (HD), Body Region:	17175 Scrotum
Systemic MRED (VX), Headache:	6922
Systemic MRED (VX), Nausea:	17306
Exposure Dosage, mg-min/m <sup>3</sup> :	1597

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3348
Background Level, ng:	26.74
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results						
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup> Mean Local	MeS, mg- min/m <sup>3</sup> Local	PF at PSD Location	
		Corrected for Background	Concentration at PSD	Dosage at PSD		
1	Scalp	4.94	0.01	0.34	4728	
2	Ear	11.87	0.03	0.81	1968	
3	Chin/Neck	102.27	0.23	6.99	228	
4	Upper Back/Nape	6.96	0.02	0.48	3356	
5	Abdomen	28.87	0.07	1.97	809	
6	Middle Back	29.00	0.07	1.98	805	
7	Armpit (Axillae)	24.22	0.06	1.66	964	
8	Right Arm, Inner	25.96	0.06	1.77	900	
9	Left Arm, Outer	22.24	0.05	1.52	1050	
10	Rt. Forearm, Inner	47.86	0.11	3.27	488	
11	Left Hand/Glove	46.44	0.11	3.17	503	
12	Lower Back	6.05	0.01	0.41	3861	
13	Groin	53.34	0.12	3.65	438	
14	Crotch	53.04	0.12	3.63	440	
15	Inner Left Thigh	12.98	0.03	0.89	1800	
16	Inner Left Shin	1.83	0.00	0.13	12764	
17	Left Foot/Boot	119.36	0.27	8.16	196	

Background 1:	22.68
Background 2:	36.30
Background 3:	21.24
Average Background:	26.74

Section 1 - Summary of Results		
Date of Test:	9-Jul-98	
Suit No.	21	
Size:	XL	
Test Participant:	Identify Subj.	
Configuration:	Kappler CPF3	
Duration of Test, min:	30	
Mean Agent Challenge, mg/m <sup>3</sup> :	53.95	
Overall PF:	1055	
MRED (HD), Body Region:	32529	Scrotum
Systemic MRED (VX), Headache:	10548	
Systemic MRED (VX), Nausea:	26371	
Exposure Dosage, mg-min/m <sup>3</sup> :	1619	

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3394
Background Level, ng:	18.69
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	Local Dosage at PSD	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD											
1	Scalp	14.01	0.03	0.96		1690								
2	Ear	14.60	0.03	1.00		1622								
3	Chin/Neck	7.22	0.02	0.49		3280								
4	Upper Back/Nape	6.45	0.01	0.44		3671								
5	Abdomen	16.38	0.04	1.12		1446								
6	Middle Back	9.12	0.02	0.62		2596								
7	Armpit (Axillae)	13.23	0.03	0.90		1790								
8	Right Arm, Inner	14.41	0.03	0.98		1643								
9	Left Arm, Outer	20.97	0.05	1.43		1129								
10	Rt. Forearm, Inner	142.52	0.32	9.74		166								
11	Left Hand/Glove	42.15	0.10	2.88		562								
12	Lower Back	6.31	0.01	0.43		3753								
13	Groin	7.69	0.02	0.53		3079								
14	Crotch	28.39	0.06	1.94		834								
15	Inner Left Thigh	19.66	0.04	1.34		1204								
16	Inner Left Shin	31.82	0.07	2.17		744								
17	Left Foot/Boot	33.90	0.08	2.32		699								
<table><tr><td>Background 1:</td><td>17.70</td></tr><tr><td>Background 2:</td><td>18.89</td></tr><tr><td>Background 3:</td><td>19.48</td></tr><tr><td>Average Background:</td><td>18.69</td></tr></table>							Background 1:	17.70	Background 2:	18.89	Background 3:	19.48	Average Background:	18.69
Background 1:	17.70													
Background 2:	18.89													
Background 3:	19.48													
Average Background:	18.69													

## Appendix B

Section 1 - Summary of Results	
Date of Test:	9-Jul-98
Suit No.	22
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	53.95
Overall PF:	928
MRED (HD), Body Region:	84569 Chin & Neck
Systemic MRED (VX), Headache:	9277
Systemic MRED (VX), Nausea:	23192
Exposure Dosage, mg-min/m <sup>3</sup> :	1619

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3394
Background Level, ng:	18.69
'Blank Mass'	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results														
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD	Location								
		Corrected for Background	Mean Local Concentration at PSD	Dosage at PSD										
1	Scalp	2.76	0.01	0.19	8579									
2	Ear	38.25	0.09	2.61	619									
3	Chin/Neck	36.12	0.08	2.47	656									
4	Upper Back/Nape	56.23	0.13	3.84	421									
5	Abdomen	33.92	0.08	2.32	698									
6	Middle Back	5.69	0.01	0.39	4162									
7	Armpit (Axillae)	24.48	0.06	1.67	967									
8	Right Arm, Inner	18.70	0.04	1.28	1266									
9	Left Arm, Outer	23.81	0.05	1.63	995									
10	Rt. Forearm, Inner	42.39	0.10	2.90	559									
11	Left Hand/Glove	18.77	0.04	1.28	1262									
12	Lower Back	30.85	0.07	2.11	768									
13	Groin	67.25	0.15	4.60	352									
14	Crotch	0.00	BBL	BBL	3394									
15	Inner Left Thigh	43.63	0.10	2.98	543									
16	Inner Left Shin	50.25	0.11	3.43	471									
17	Left Foot/Boot	11.86	0.03	0.81	1997									
<table><tr><td>Background 1:</td><td>17.70</td></tr><tr><td>Background 2:</td><td>18.89</td></tr><tr><td>Background 3:</td><td>19.48</td></tr><tr><td>Average Background:</td><td>18.69</td></tr></table>							Background 1:	17.70	Background 2:	18.89	Background 3:	19.48	Average Background:	18.69
Background 1:	17.70													
Background 2:	18.89													
Background 3:	19.48													
Average Background:	18.69													

# Appendix B

Section 1 - Summary of Results	
Date of Test:	9-Jul-98
Suit No.	23
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	52.77
Overall PF:	484
MRED (HD), Body Region:	10935 Scrotum
Systemic MRED (VX), Headache:	4839
Systemic MRED (VX), Nausea:	12098
Exposure Dosage, mg-min/m <sup>3</sup> :	1583

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3320
Background Level, ng:	18.69
'Blank Mass'	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results													
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location								
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD									
1	Scalp	19.61	0.04	1.34	1181								
2	Ear	43.93	0.10	3.00	527								
3	Chin/Neck	37.81	0.09	2.58	613								
4	Upper Back/Nape	19.84	0.05	1.36	1167								
5	Abdomen	24.59	0.06	1.68	942								
6	Middle Back	14.36	0.03	0.98	1613								
7	Armpit (Axillae)	291.12	0.66	19.90	80								
8	Right Arm, Inner	24.82	0.06	1.70	933								
9	Left Arm, Outer	11.70	0.03	0.80	1979								
10	Rt. Forearm, Inner	126.62	0.29	8.65	183								
11	Left Hand/Glove	60.91	0.14	4.16	380								
12	Lower Back	12.63	0.03	0.86	1834								
13	Groin	82.54	0.19	5.64	281								
14	Crotch	82.60	0.19	5.65	280								
15	Inner Left Thigh	26.22	0.06	1.79	883								
16	Inner Left Shin	8.57	0.02	0.59	2702								
17	Left Foot/Boot	24.08	0.05	1.65	962								
<table><tr><td>Background 1:</td><td>17.70</td></tr><tr><td>Background 2:</td><td>18.89</td></tr><tr><td>Background 3:</td><td>19.48</td></tr><tr><td>Average Background:</td><td>18.69</td></tr></table>						Background 1:	17.70	Background 2:	18.89	Background 3:	19.48	Average Background:	18.69
Background 1:	17.70												
Background 2:	18.89												
Background 3:	19.48												
Average Background:	18.69												

Section 1 - Summary of Results	
Date of Test:	9-Jul-98
Suit No.	24
Size:	XL
Test Participant:	Identify Subj.
Configuration:	Kappler CPF3
Duration of Test, min:	30
Mean Agent Challenge, mg/m <sup>3</sup> :	52.77
Overall PF:	1534
MRED (HD), Body Region:	29355 Scrotum
Systemic MRED (VX), Headache:	15336
Systemic MRED (VX), Nausea:	38340
Exposure Dosage, mg-min/m <sup>3</sup> :	1583

Section 2 - Factors, Calculations and Notes	
Sampler Flow Rate, cm <sup>3</sup> /min	14.63
Min GC-Detectable Mass, ng:	6.98
Min GC-Detectable Concentration:	0.016
Maximum Measureable PF:	3320
Background Level, ng:	18.69
"Blank Mass"	34.8065
Avg Non-MS Peak	0.00
BBL	Below Background Level

Section 3 - PSD Data, Calculations and Results					
PSD No.	PSD Location	MeS, ng	MeS, mg/m <sup>3</sup>	MeS, mg-min/m <sup>3</sup>	PF at PSD Location
		Corrected for Background	Mean Local Concentration at PSD	Local Dosage at PSD	
1	Scalp	14.72	0.03	1.01	1573
2	Ear	0.00	BBL	BBL	3320
3	Chin/Neck	7.11	0.02	0.49	3257
4	Upper Back/Nape	16.25	0.04	1.11	1425
5	Abdomen	0.77	0.00	0.05	30078
6	Middle Back	5.17	0.01	0.35	4480
7	Armpit (Axillae)	28.13	0.06	1.92	823
8	Right Arm, Inner	8.51	0.02	0.58	2722
9	Left Arm, Outer	9.27	0.02	0.63	2498
10	Rt. Forearm, Inner	8.25	0.02	0.56	2807
11	Left Hand/Glove	16.29	0.04	1.11	1422
12	Lower Back	0.00	BBL	BBL	3320
13	Groin	149.04	0.34	10.19	155
14	Crotch	30.77	0.07	2.10	753
15	Inner Left Thigh	20.93	0.05	1.43	1107
16	Inner Left Shin	3.86	0.01	0.26	6000
17	Left Foot/Boot	13.59	0.03	0.93	1704

Background 1:	17.70
Background 2:	18.89
Background 3:	19.48
Average Background:	18.69